Project Final Report

Dedham Mother Brook BMP Implementation Project
15-02/319

Dates: 2015 – 2017

Town of Dedham

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PREPARED FOR:

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER RESOURCES

AND

US ENVIRONMENTAL PROTECTION AGENCY
REGION 1

MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
Matthew A. Beaton, Secretary

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Martin Suuberg, Commissioner

BUREAU OF WATER RESOURCES
Douglas Fine, Assistant Commissioner

DIVISION OF MUNICIPAL SERVICES
Steven J. McCurdy, Director

A. Project Snapshot

Project Number and Title: Dedham Mother Brook BMP Implementation Project 15-02/319

A1. Project start date: 3/30/15

A2. Date closed: 6/8/17

A3. Basin and HUC 12 subwatershed: Boston Harbor Basin, Neponset River HUC 12

A4. Segment and/or waterbody number(s): Mother Brook (MA73-28)

A5. Status of waterbody (Category 5, etc.): Category 5

A6. Priority Pollutant(s) targeted: Sediment, Bacteria, Phosphorus, Nitrogen

A7. Estimated Annual Pollutant removal (quantity, not percentage)

N: 20.2 lbs.

P: 7.9 lbs.

Sediment: 2,490 lbs.

Bacteria: 246,233 billion colonies

Other: N/A

Method of Determination and calculations: Simple Method

A8. BMPs installed, number and type: Two Bioretention Cells, One Water Quality Swale, and One Subsurface Infiltrator

Descriptive Project Summary

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 15-02/319

PROJECT TITLE: Dedham Mother Brook BMP Implementation Project 15-02/319
NPS CATEGORY: Urban Runnoff
INVESTIGATOR: Town of Dedham, Public Works and Engineering Departments
LOCATION: Mother Brook, Boston Harbor Watershed Neponset; Dedham, MA

DESCRIPTION:
The Dedham Mother Brook BMP Implementation Project was completed through the joint efforts of the Town of Dedham Engineering Department, the Town of Dedham department of Public Works, and the Neponset River Watershed Association, with the guidance of MassDEP. It consisted of three major components: creating final engineering design plans for three of the top priority sites identified in the Dedham BMP Development 604b Project (2010-02/604), constructing four structural stormwater BMPs according to the design plan specifications, and implementing a town-wide education and outreach campaign focused on stormwater issues. The Town of Dedham Engineering Department completed most of the engineering design and construction in-house, and the Neponset River Watershed Association completed the education and outreach campaign and helped manage the grant and reporting.

The Dedham Mother Brook BMP Implementation Project (15-02/319) was undertaken in order to partially implement the Neponset River Bacteria TMDL (2592), and to make progress towards attaining compliance with the water quality standards for Mother Brook by reducing bacteria, phosphorus, nitrogen, and sediment pollutant loading through structural BMPs and public education.

Bioretention cells were constructed at the intersection of Colburn and Hyde Park St, and at the intersection of Saw Mill Lane and Emmet Ave, and a water quality swale with a subsurface infiltrator was installed along the shoulder of Avery St. The Stormwater BMPs were designed to collect and filter stormwater runoff from nearby streets before discharging cleaned stormwater to Mother Brook. After construction was completed, the Town of Dedham developed operation and maintenance plans for each of the BMPs to ensure that they function properly in the long term. The education and outreach campaign consisted of a town-wide educational mailer that was also posted on the town website, regular blog post updates on project progress, and interpretive signage posted at each of the BMPs. All components of the project were evaluated by MassDEP staff to ensure that they met MassDEP quality standards. The project was completed under budget.

PROJECT COST: $119,302.44

FUNDING: $71,253.98 by the US EPA
$48,048.46 by grantee, Neponset Watershed Assn and project consultant

DURATION: 2015 – 2017

C. Project Finances

The project was completed under budget largely as the result of efficiencies gained by completing much of the engineering and construction using in-house labor by the Town of Dedham. There were several budget amendments over the course of the project to reflect the lower than expected costs and to funds between budget line item categories as final expenditures were made.

The 40% project match was provided by the Town of Dedham through a combination of cash and in-kind contributions toward labor, materials and subcontractors. In addition, both the Neponset River Watershed Association and the project engineering subcontractor provided small additions to the match through contribution of in-kind services.

Copies of the original and amended project budget are included beow

Attachment B
Project Budget

Dedham Mother Brook BMP Implementation Project
15-02/319

Expense Items	s.319 Amount	Non-Federal Match	Total Amount
Salaries, Fringe and Overhead (Town of Dedham)	$51,520	$51,826	$103,346
Town Engineer ($55-65/hr)			
Civil Engineer ($40-60/hr)			
DPW Director ($60-$70)			
DPW Foreman ($55-$65/hr)			
Equipment Operator ($35-60/hr)			
Laborer ($25-50/hr)			
Police Detail (47-57/hr)			
Subtotal	**$51,520**	**$51,826**	**$103,346**
Subcontractual Services			
BMP Design, Permitting, Bidding and Award	$10,000		$10,000
Outreach and Training Program (NepRWA)	$5,192		$5,192
Reporting (NepRWA)	$2,000		$2,000
Subtotal	**$17,192**		**$17,192**
Materials and Supplies:			
Printing Postage, and Signage	$5,000		$5,000
Construction Material for BMPs	$14,401	$3,185	$17,586
Subtotal	**$19,401**	**$3,185**	**$22,586**
Other			
Town construction equipment costs		$5,000	$5,000
Subtotal		**$5,000**	**$5,000**
Totals:	**$88,113**	**$60,011**	**$148,124**
Percent	**59.5%**	**40.5%**	**100%**

The Disadvantaged Business Enterprise, (DBE) Program "Fair Share" goals for the project are: $5,036 for D/MBE (3.4%) and for $5,629 D/WBE (3.8%). Firms utilized in Federally Assisted Projects must be certified as either an MBE or WBE *and* a DBE to qualify.

The Department will retain 10% of the total maximum obligation of the 319 grant funds or the final invoice submitted by the Grantee, whichever is greater, until all contract provisions are satisfied and final reports and other products are delivered and accepted. This 10% retainage shall be reflected on each invoice submitted by the Grantee and will be cumulative in the amount of $8,811 (10% of the contract amount.

Attachment B
Project Budget – Amended February 2, 2017

Dedham Mother Brook BMP Implementation Project
15-02/319

Expense Items	s.319 Amount	Amendment	Non-Federal Match	Total Amount
Salaries, Fringe and Overhead (Town of Dedham)	$51,520	$14,998	$51,826	$66,824
Town Engineer ($55-65/hr)				
Civil Engineer ($40-60/hr)				
DPW Director ($60-$70)				
DPW Foreman ($55-$65/hr)				
Equipment Operator ($35-60/hr)				
Laborer ($25-50/hr)				
Police Detail (47-57/hr)				
Subtotal	**$51,520**	**$14,998**	**$51,826**	**$66,824**
Subcontractual Services				
BMP Design, Permitting, Bidding and Award	$10,000	$ 9,000		$ 9,000
Construction and Landscaping Contractors		$24,500		$24,500
Outreach and Training Program (NepRWA)	$5,192	$7,915		$7,915
Reporting (NepRWA)	$2,000	$2,500		$2,500
Subtotal	**$17,192**	**$43,915**		**$43,915**
Materials and Supplies:				
Printing Postage, and Signage	$5,000	$5,200		$5,200
Construction Material for BMPs	$14,401	$24,000	$3,185	$24,000
Subtotal	**$19,401**	**$29,200**	**$3,185**	**$32,385**
Other				
Town construction equipment costs			$5,000	$5,000
Subtotal			**$5,000**	**$5,000**
Totals:	**$88,113**	**$88,113**	**$60,011**	**$148,124**
Percent	**59.5%**	**59.5%**	**40.5%**	**100%**

The Disadvantaged Business Enterprise, (DBE) Program "Fair Share" goals for the project are: $5,036 for D/MBE (3.4%) and for $5,629 D/WBE (3.8%). Firms utilized in Federally Assisted Projects must be certified as either an MBE or WBE *and* a DBE to qualify.

The Department will retain 10% of the total maximum obligation of the 319 grant funds or the final invoice submitted by the Grantee, whichever is greater, until all contract provisions are satisfied and final reports and other products are delivered and accepted. This 10% retainage shall be reflected on each invoice submitted by the Grantee and will be cumulative in the amount of $8,811 (10% of the contract amount.

Amended 2/2/2017 to better reflect actual project costs. Approved M. Harper, 2/2/2017.

D. BMPs

Sawmill Lane Bioretention Cell

1. Type of BMP: Bioretention Cell
2. Date of implementation: 11/1/2016
3. Size of treatment area: 14,560 sqft.
4. Area land use: Residential
5. Pollutant load removed:
    a. Sediment: 478 lbs.
    b. P: 1.5 lbs.
    c. N: 3.5 lbs.
    d. Bacteria: 42,091 billions of colonies
6. Method of pollutant load removal determination and calculations: Simple Method
7. Signed statement: "The estimations in this report were determined using the appropriate estimation model(s) and applied according to the procedures prescribed for the model. To the best of my knowledge these are reasonable estimates using appropriate methods. Documentation is kept on file by the grantee and is available for review by MassDEP/EPA."

Colburn Street Bioretention Cell

1. Type of BMP: Bioretention Cell
2. Date of implementation: 11/1/2016
3. Size of treatment area: 33,300 sq ft.
4. Area land use: Residential
5. Pollutant load removed:
    a. Sediment: 914 lbs.
    b. P: 2.9 lbs.
    c. N: 7.4 lbs.
    d. Bacteria: 89,622 billion of colonies
6. Method of pollutant load removal determination and calculations: Simple Method
7. Signed statement: "The estimations in this report were determined using the appropriate estimation model(s) and applied according to the procedures prescribed for the model. To the best of my knowledge these are reasonable estimates using appropriate methods. Documentation is kept on file by the grantee and is available for review by MassDEP/EPA."

Avery Street Water Quality Swale

1. Type of BMP: Water Quality Swale
2. Date of implementation: 6/1/2017
3. Size of treatment area: 13,100 sqft.
4. Area land use: Residential

5. Pollutant load removed:
    a. Sediment: 669 lbs.
    b. P: 2.1 lbs.
    c. N: 3.9 lbs.
    d. Bacteria: 48,845 billions of colonies
6. Method of pollutant load removal determination and calculations: Simple Method
7. Signed statement: "The estimations in this report were determined using the appropriate estimation model(s) and applied according to the procedures prescribed for the model. To the best of my knowledge these are reasonable estimates using appropriate methods. Documentation is kept on file by the grantee and is available for review by MassDEP/EPA."

Avery Street Sub-surface Infiltration System

1. Type of BMP:
2. Date of implementation: 6/1/2017
3. Size of treatment area: 20,390 sqft
4. Area land use: Residential
5. Pollutant load removed:
    a. Sediment: 429 lbs.
    b. P: 1.4 lbs.
    c. N: 5.4 lbs.
    d. Bacteria: 65,575 billions of colonies
6. Method of pollutant load removal determination and calculations: Simple Method
7. Signed statement: "The estimations in this report were determined using the appropriate estimation model(s) and applied according to the procedures prescribed for the model. To the best of my knowledge these are reasonable estimates using appropriate methods. Documentation is kept on file by the grantee and is available for review by MassDEP/EPA."

Table 1: Summary of annual pollutant load reduction estimates calculated using the simple method.

Site Name	BMP Type	Annual TSS (lbs)	Annual TP (lbs)	Annual TN (lbs)	Annual FC (Billion of colonies)
Colburn Street	Bioretention Cell	914	2.9	7.4	89,622
Avery Street	Water Quality Swale	669	2.1	3.9	48,845
Avery Street	Subsurface Infiltrator	429	1.4	5.4	65,575
Saw Mill Lane	Bioretention Cell	478	1.5	3.5	42,091
Total		2,490	7.9	20.2	246,173

D. Lessons Learned

This project demonstrated that municipalities are capable of successfully completing complex stormwater retrofit design and construction projects, using in-house resources and that this approach is significantly more cost effective than reliance on outside consultants and contractors. Having seen this firsthand, the Neponset River Watershed Association plans to shift some of its focus towards encouraging municipalities to utilize internal resources on future BMP implementation projects in order to reduce cost, increase project efficiency, and build the capacity of our municipalities to manage stormwater more effectively.

F1 Attachments: Maps


BMP Project Locations, Dedham, MA
Colburn/Whitehall
Avery St.
Sawmill Ln./Dedham Blvd.
N
W
E
S
Legend
Project Areas

F2. Attachments

Deliverables Task 1: Quality Assurance and Project Evaluation

Retrofit Design Summary Table
Dedham Stormwater Retrofits
28-Jun-12

No.	Catchment Area	Stormwater Best Management Practice	Drainage Area (sf)	1-inch Water Quality Volume (cf)	WQV Treated (cf)	%WQV Treated	Construction Cost	Annual O&M Cost
1	Colburn Street	Biorention Basin	33,330	2778	2,875	104%	$ 41,520	$ 1,000
2W	Avery Street	Water Quality Swale	14,560	1213	1,263	104%	$ 43,000	$ 1,500
2E	Avery Street	Subsurface Infiltration	20,390	1699	1,742	103%		
3	Sawmill Lane/ Dedham Blvd	Biorention Basin	13,100	1092	1,133	104%	$ 15,620	$ 1,000

Prepared by: Nitsch Engineering
June 2012
Prepare for: Neponset River Watershed Association
Dedham, MA

Runoff and Pollutant Load Calculations
Dedham Stormwater Retrofits
28-Jun-12

No.	Catchment Area	Stormwater Best Management Practice	(A) Area (ac.)	(R) Runoff (in.)	(L) Annual TSS (lbs)	(L) Annual TP (lbs)	(L) Annual TN (lbs)	(L) Annual FC (billion colonies)
1	Colburn Street	Biorention Basin	0.64	36.8	914	2.9	7.4	89,622
2W	Avery Street	Water Quality Swale	0.33	36.8	478	1.5	3.9	46,845
2E	Avery Street	Subsurface Infiltration	0.47	36.8	669	2.1	5.4	65,575
3	Sawmill Lane/ Dedham Blvd	Biorention Basin	0.30	36.8	429	1.4	3.5	42,091

Coefficients for Use in Polluted Load Calculations

Landuse	% Impervious	(C) TSS (mg/l)	(C) TP (mg/l)	(C) TN (mg/l)	Fecal Coliform (1,000 colonies/ ml)
Residential Street	100%	172	0.55	1.40	37

Pollutant Loading Formulas - The Simple Method:

TSS, TP, & TN:
L = 0.226 * R *C* A

Where: L=Annual load (lbs)
R=Annual runoff (inches)
C=Pollutant concentration (mg/l)
A=Area (acres)
0.226=Unit conversion factor

Fecal Coliform (FC):
L = 103* R *C* A

Where: L=Annual load (billion colonies)
R=Annual runoff (inches)
C=Bacteria concentration (1,000 colonies/ml)
A=Area (acres)
103=Unit conversion factor

$R = P * P_j * Rv$

Where: R=Annual runoff= 43 inches
P=Annual rainfall (inches)
Pj =Fraction of annual rainfall events that produce runoff (assume 0.9)
Rv=Runoff Coeffiicient

References:

1. New York State Stormwater Management Design Manual, Appendix A-The Simple Method to Calculate Urban Stormwater Loads
http://www.dec.ny.gov/docs/water_pdf/simple.pdf

Prepared by: Nitsch Engineering
June 2012
Prepare for: Neponset River Watershed Association
Dedham, MA

Pollutant Removal Calculations
Dedham Stormwater Retrofits
28-Jun-12

				BMP Removal Efficiency				Quantity of Pollutant Removed			
No.	Catchment Area	BMP Type	Drainage Area (ac.)	TSS Removal (%)	TP Removal (%)	TN Removal (%)	Fecal Coliform Removal (%)	Annual TSS Removed (lbs.)	Annual TP Removed (lbs.)	Annual TN Removed (lbs.)	Annual FC Removed (billion collonies)
1	Colburn Street	Biorention Basin	0.64	90%	60%	40%	70%	823	1.8	3.0	62,735
2W	Avery Street	Water Quality Swale	0.33	70%	40%	50%	70%	334	0.6	1.9	32,792
2E	Avery Street	Subsurface Infiltration	0.47	80%	70%	50%	90%	535	1.5	2.7	59,018
3	Sawmill Lane/ Dedham Blvd	Biorention Basin	0.30	90%	60%	70%	70%	386	0.8	2.4	29,464

BMP Removal Efficiencies

BMP Type	TSS Removal (%)	TP Removal (%)	TN Removal (%)	Fecal Coliform (FC) Removal (%)
Biorention Basin	90%	60%	40%	70%
Water Quality Swale	70%	40%	50%	70%
Subsurface Infiltration	80%	70%	50%	90%

Annual Calculated Pollutant Load (from Table 1)

No.	Catchment Area	Annual TSS (lbs)	Annual TP (lbs)	Annual TN (lbs)	Annual FC (billion colonies)
1	Colburn Street	914	2.9	7.4	89,622
2W	Avery Street	478	1.5	3.9	46,845
2E	Avery Street	669	2.1	5.4	65,575
3	Sawmill Lane/ Dedham Blvd	429	1.4	3.5	42,091

References:

1. New York State Stormwater Management Design Manual, Appendix A-The Simple Method to Calculate Urban Stormwater Loads
http://www.dec.ny.gov/docs/water_pdf/simple.pdf
2. Massachusetts Stormwater Handbook, Volume 2 Chapter 2: Structural BMP Specifications for the Massachusetts Stormwater Handbook
http://www.mass.gov/dep/water/laws/policies.htm#storm

Prepared by: Nitsch Engineering
June 2012
Prepared for: Neponset River Watershed Association
Dedham, MA

Preliminary Cost Estimate
Dedham Stormwater Retrofits
6/28/2012

Colburn BMP: Bioretention Basin with Stone Swale

	Unit Cost	Unit	Quantity	Total Cost
Bioretention Basin	$ 10.00	sf	2700	$ 27,000
Sediment Forebay	$ 5.00	sf	1000	$ 5,000
Stone Swale	$ 6.00	sf	410	$ 2,460
12" CPP Pipe	$ 18.00	lf	140	$ 2,520
Drainage Structures	$ 2,200.00	ea	2	$ 4,400
Flared End	$ 70.00	ea	2	$ 140
			Materials & Installation Total	$ 41,520
			Design and Permitting Estimate	$ 15,000
			Estimated Annual Operation and Maintenance	$ 1,000

Sawmill BMP: Bioretention Basin with Stone Swale

	Unit Cost	Unit	Quantity	Total Cost
Bioretention Basin	$ 10.00	sf	1000	$ 10,000
Stone Swale	$ 6.00	sf	570	$ 3,420
Drainage Structures	$ 2,200.00	ea	1	$ 2,200
			Materials & Installation Total	$ 15,620
			Design and Permitting Estimate	$ 10,000
			Estimated Annual Operation and Maintenance	$ 1,000.0

Avery BMP: Water Quality Swale with Subsurface Recharge

	Unit Cost	Unit	Quantity	Total Cost
Water Quality Swale	$ 10.00	sf	1000	$ 10,000
Oil and Grit Separator	$ 10,000.00	ea	1	$ 10,000
Stone Swale	$ 6.00	sf	150	$ 900
Stone Check Dams	$ 100.00	ea	4	$ 400
Subsurface Recharge	$ 15.00	sf	1240	$ 18,600
12" CPP Pipe	$ 18.00	lf	50	$ 900
Drainage Structures	$ 2,200.00	ea	1	$ 2,200
			Materials & Installation Total	$ 43,000
			Design and Permitting	$ 15,000
			Estimated Annual Operation and Maintenance	$ 1,500

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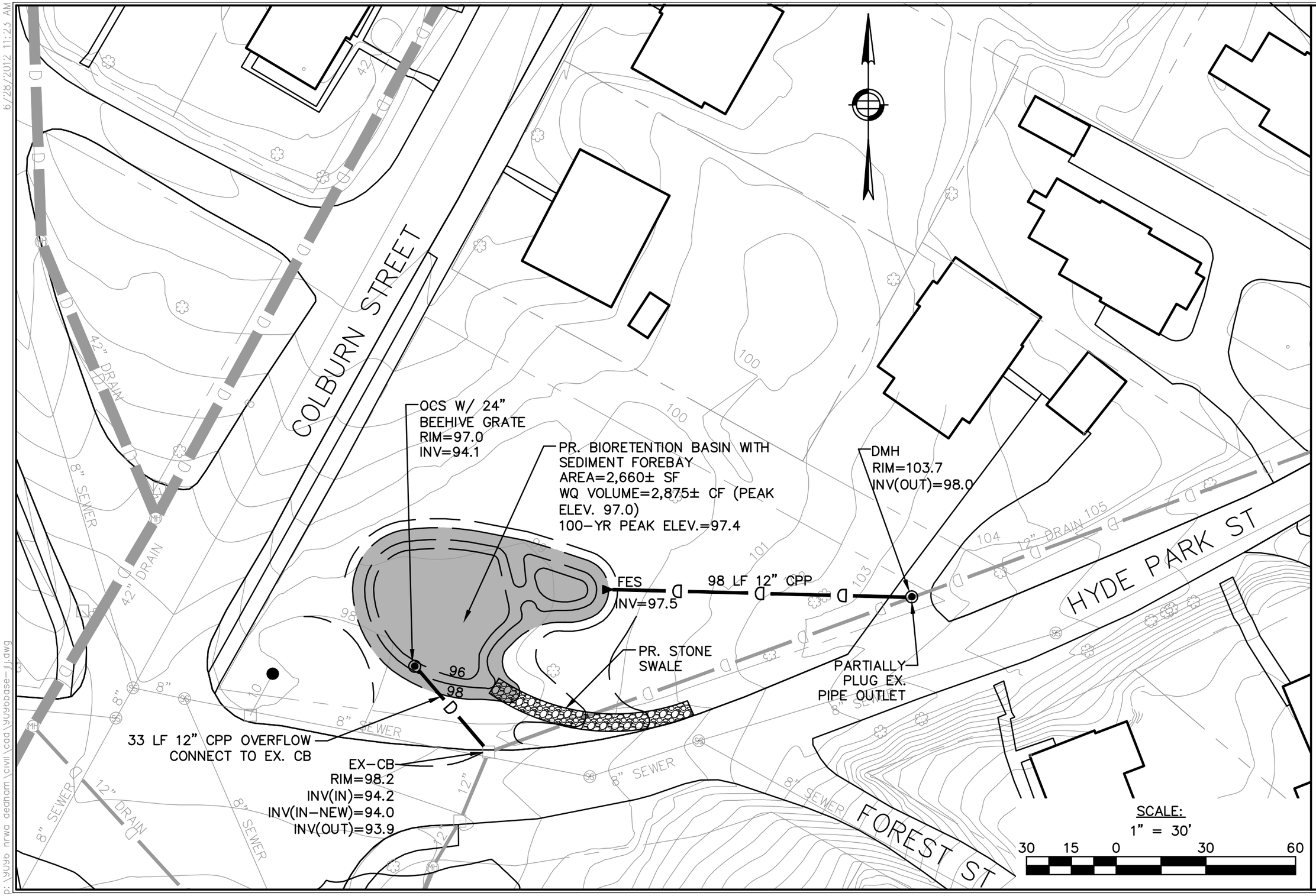

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- Land Surveying
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- Sustainable Site Consulting
- Planning
- GIS

PROPOSED BIORETENTION BASIN RETROFIT

COLBURN STREET
DEDHAM, MA

PREPARED FOR:
NEPONSET RIVER WATERSHED ASSOCIATION
CANTON, MA

PROJECT #	9096
FILE:	9096CBA.DWG
SCALE:	1"=30'
DATE:	06/28/2012
PROJECT MGR:	NH
SURVEYOR:	
DRAFTED BY:	JLJ
CHECKED BY:	NH

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WATERSHED MAP FOR COLBURN STREET RETROFIT

COLBURN STREET
DEDHAM, MA

PREPARED FOR:
NEPONSET RIVER WATERSHED ASSOCIATION
CANTON, MA

PROJECT #	9096
FILE:	9096CBA.DWG
SCALE:	1"=30'
DATE:	06/28/2012
PROJECT MGR:	NH
SURVEYOR:	
DRAFTED BY:	JLJ
CHECKED BY:	NH

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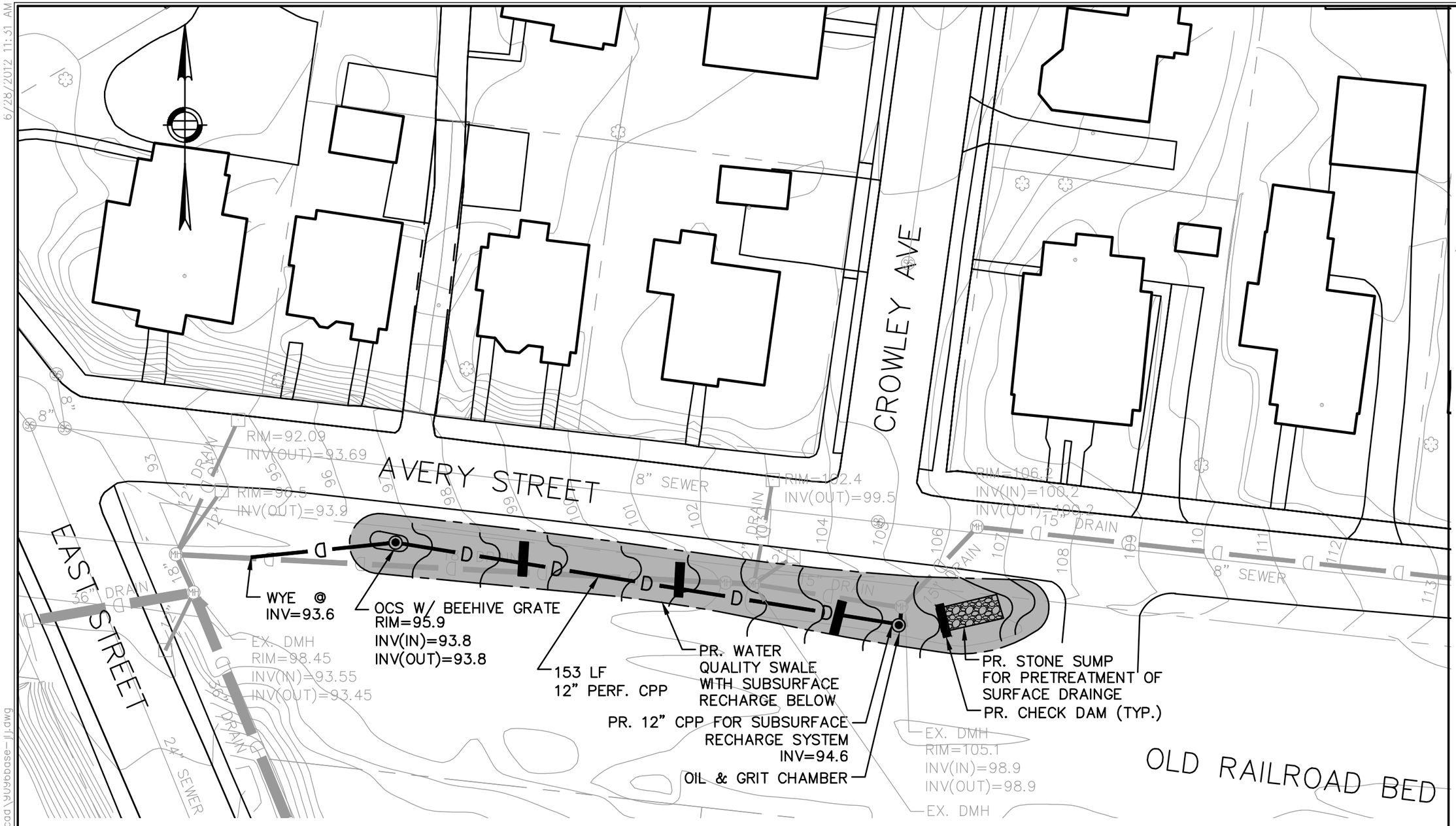

WATER QUALITY VOLUME SUMMARY
WATER QUALITY SWALE FOR SURFACE DRAINAGE
WQ VOLUME = 1,260 ± CF

SUBSURFACE RECHARGE FOR CLOSED DRAINAGE
WQ VOLUME = 1,740± CF

SCALE:
1" = 30'

30 15 0 30 60

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PROPOSED WATER QUALITY SWALE
AVERY STREET
DEDHAM, MA

PREPARED FOR:
NEPONSET RIVER WATERSHED ASSOCIATION
CANTON, MA

PROJECT #	9096
FILE:	9096CBA.DWG
SCALE:	1"=30'
DATE:	06/28/2012
PROJECT MGR:	NH
SURVEYOR:	
DRAFTED BY:	JLJ
CHECKED BY:	NH

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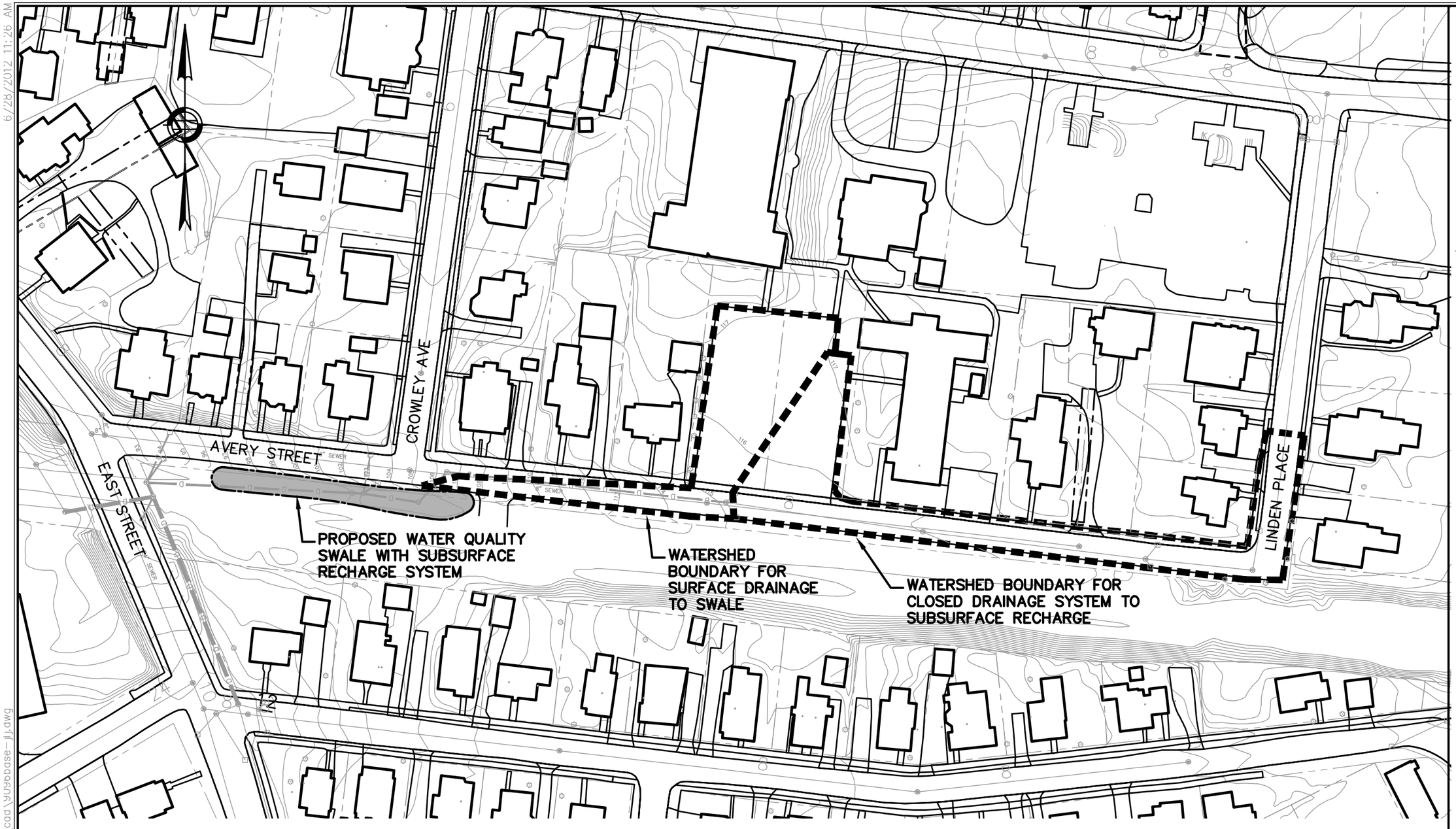

SCALE:
1" = 80'

80 40 0 80 160

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WATERSHED MAP FOR AVERY STREET RETROFIT

AVERY STREET
DEDHAM, MA

PREPARED FOR:
NEPONSET RIVER WATERSHED ASSOCIATION
CANTON, MA

PROJECT #	9096
FILE:	9096CBA.DWG
SCALE:	1"=30'
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SURVEYOR:	
DRAFTED BY:	JLJ
CHECKED BY:	NH

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EMMETT AVE

PR. BIORETENTION BASIN
AREA=970± SF
WQ VOLUME=1,130± CF (PEAK ELEV.=80.0)
100 YR PEAK ELEV.=80.2±

MAINTAIN
EXISTING
STONE SWALE

DEDHAM BLVD

6" DRAIN

EX. CB
RIM=78.4
INV=75.85

OCS (CONVERT EX. CB)
RIM=80.5
MAINTAIN EX. OUTLET

24" DRAIN

8" SEWER

SAWMILL LANE

STORMY HILL

SCALE:
1" = 30'
30 15 0 30 60

Nitsch Engineering

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- Sustainable Site Consulting
- Planning
- GIS

PROPOSED STORMWATER RETROFIT
SAWMILL LANE/DEDHAM BLVD
DEDHAM, MA

PREPARED FOR:
NEPONSET RIVER WATERSHED ASSOCIATION
CANTON, MA

PROJECT #	9096
FILE:	9096CBA.DWG
SCALE:	1"=30'
DATE:	06/28/2012
PROJECT MGR:	NH
SURVEYOR:	
DRAFTED BY:	JLJ
CHECKED BY:	NH

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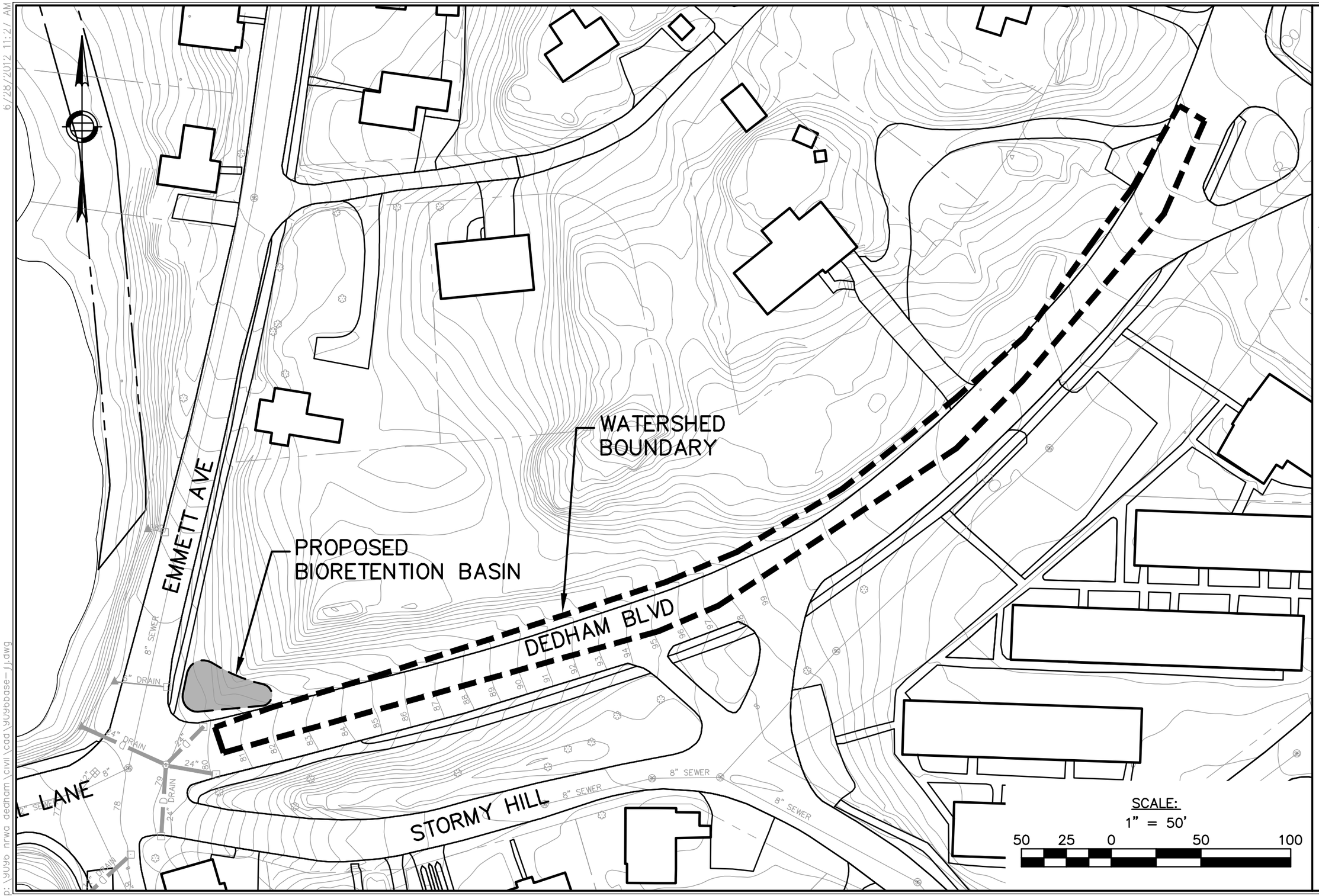

Nitsch Engineering

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WATERSHED MAP FOR SAWMILL LANE RETROFIT

SAWMILL LANE/DEDHAM BLVD
DEDHAM, MA

PREPARED FOR:
NEPONSET RIVER WATERSHED ASSOCIATION
CANTON, MA

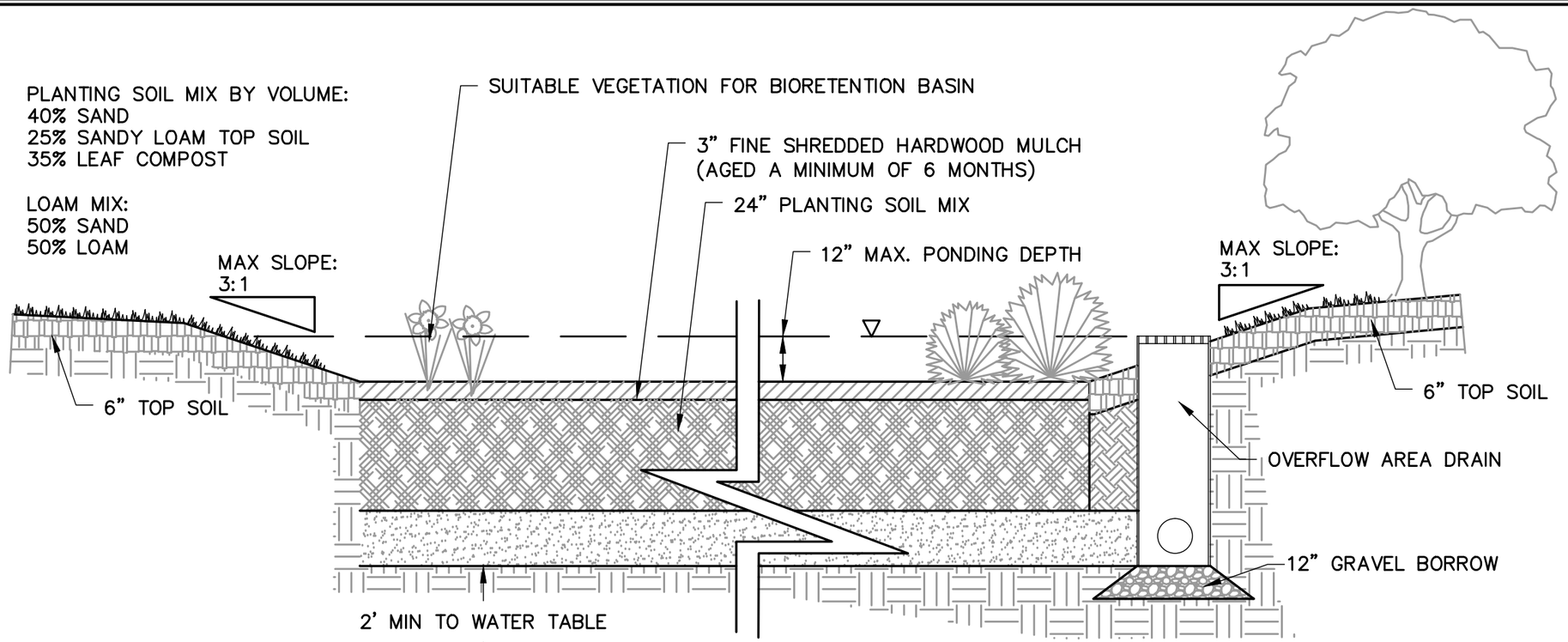
PROJECT #	9096
FILE:	9096CBA.DWG
SCALE:	1"=30'
DATE:	06/28/2012
PROJECT MGR:	NH
SURVEYOR:	
DRAFTED BY:	JLJ
CHECKED BY:	NH

C-3B

P:\9096 nrwa dedham\civil\cad\9096base-jlj.dwg

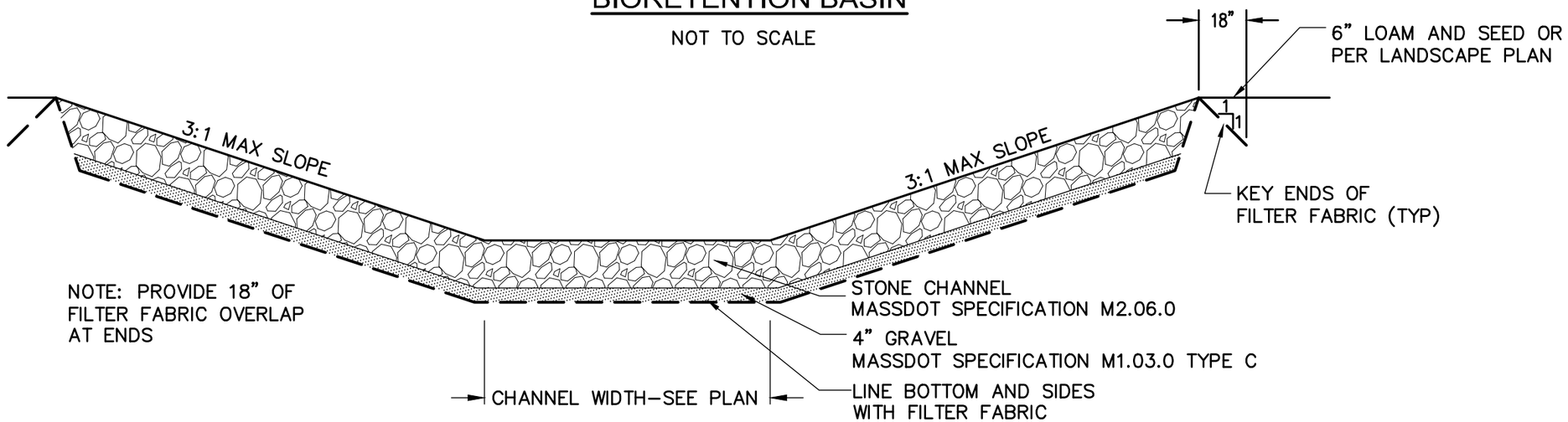
PLANTING SOIL MIX BY VOLUME:
40% SAND
25% SANDY LOAM TOP SOIL
35% LEAF COMPOST

LOAM MIX:
50% SAND
50% LOAM



BIORETENTION BASIN

NOT TO SCALE



STONE SWALE

NOT TO SCALE

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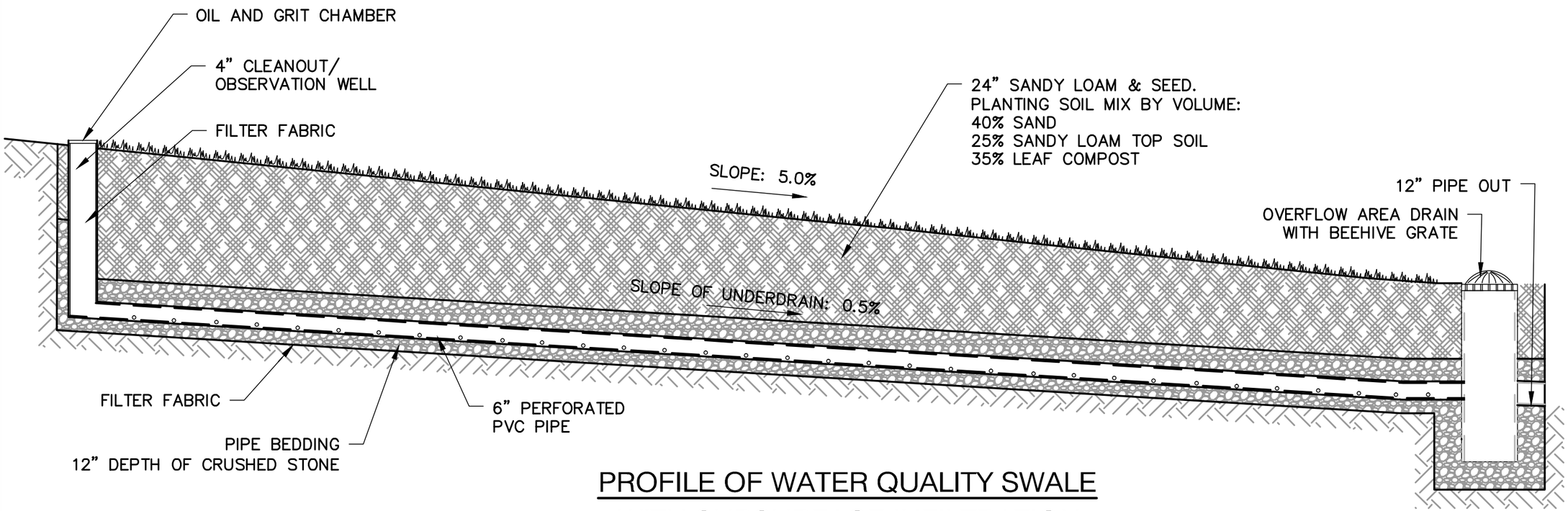
BIORETENTION BASIN AND STONE SWALE DETAILS
DEDHAM, MA

PREPARED FOR:
NEPONSET RIVER WATERSHED ASSOCIATION
CANTON, MA

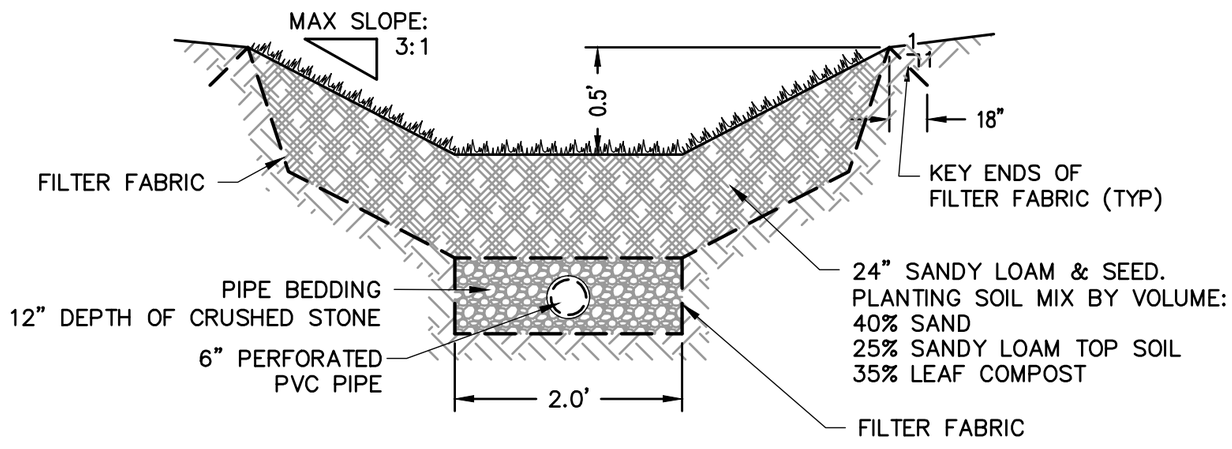
PROJECT #	9096
FILE:	9096CBA.DWG
SCALE:	1"=30'
DATE:	06/28/2012
PROJECT MGR:	NH
SURVEYOR:	
DRAFTED BY:	JLJ
CHECKED BY:	NH

C-4A



PROFILE OF WATER QUALITY SWALE WITH SUBSURFACE INFILTRATION

NOT TO SCALE



SWALE CROSS SECTION

NOT TO SCALE

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WATER QUALITY SWALE WITH SUBSURFACE INFILTRATION
SAWMILL LANE/DEDHAM BLVD
DEDHAM, MA

PREPARED FOR:
NEPONSET RIVER WATERSHED ASSOCIATION
CANTON, MA

PROJECT # 9096
FILE: 9096CBA.DWG
SCALE: 1"=30'
DATE: 06/28/2012
PROJECT MGR: NH
SURVEYOR:
DRAFTED BY: JLJ
CHECKED BY: NH

C-4B

Low Priority Sites - Construction Cost Estimate
Dedham Stormwater Retrofits
6/28/2012

Nitsch Engineering

Rank	Site Location	Site ID	BMP Type	Construction Cost Estimate	Annual O&M Estimate
4	Fire Station	30	Bioretention Basin	$20,000	$1,000
5	Brookdale Ave	20	Bioretention Basin	$55,000	$1,000
6	High School 2	17	Tree Box Filters (4)	$25,000	$800
7	Whiting Ave	15	Leaching Catch Basins (10)	$60,000	$1,000
8	Commerce Way	14	Bioretention Basin	$195,000	$1,500
9	Eastern Ave	27	Tree Box Filters (6) / Bioretention Basin	$65,000	$1,500
10	Dedham Blvd	6	Bioretention Basin	$78,000	$1,500

F2. Attachments

Deliverables Task 2: Design and Construct BMPs

LEGEND

PROPOSED STONE WALL

220 PROPOSED CONTOUR

220 EXISTING CONTOUR

PROPOSED SILT SOCK

PROPOSED SILT SACK

PROPOSED VEGETATED SILT SOCK CHECK DAM TO BE LEFT IN-PLACE AFTER CONSTRUCTION

10 5 0 10 20

Graphic Scale
1 inch = 10 feet

HOUSE NO. 73

HOUSE NO. 71

HOUSE NO. 67

HOUSE NO. 63

HOUSE NO. 53

AVERY STREET

CROWLEY AVE

EAST STREET

OLD RAILROAD BED

EX. CB
RIM=96.77
INV(OUT)=93.69

EX. CB
RIM=96.53
INV(OUT)=93.90

U.P. 7A

OUTREACH SIGN

SIGN

TH-03
MAY 27, 2015

TBM 1
NAIL IN U.P. 8
EL=98.47

DRILLHOLE SET
EL. 98.26

EX. DMH-3
RIM=98.64
INV IN (a)=93.89

EX. DMH
RIM=98.76
INV(IN)=93.55
INV(OUT)=93.45

7 C2.2 VEGETATED COMPOST FILTER SOCK
TOP ELV=97.00

1 C2.1 OVERFLOW CONTROL STRUCTURE
W/BEEHIVE GRATE
RIM=96.75
INV(IN)=93.85
INV(OUT)=96.20

2 C2.1 DMH-1
RIM=97.00
INV(a)=96.00
INV(b)=95.02
INV(OUT)=94.92

LOAM & SEED ALL DISTURBED AREAS

9 C2.1 DROP INVERT AFTER CROSSING PIPE (a)
INV(HIGH/EAST)=99.7±
INV(LOW/WEST)=94.0±

15" PERF. COR. HDPE
L=109' S=0.005

18" DRAIN

6 C2.1 PR. 15" CORRUGATED HDPE
SUBSURFACE INFILTRATION SYSTEM

EX. DMH
(RECORD - N.F.)

EX. DMH-2
RIM=102.55
INV IN(a)=97.58
INV IN(b)=97.58
INV IN(c)=97.77
INV(OUT)=96.80

EX. CB
RIM=102.57

EX. CB
RIM=103.23

15" PERF. COR. HDPE
L=35' S=0.005

WQU-1
RIM=104.30
INV (IN)=100.1
INV (OUT)=99.85

4 C2.1

15" HDPE
L=3'±

PLUG EX. 15"
DRAIN OUTLET

EX. DMH-1
CONNECT TO PR. WQU-1
PLUG EX. 15" OUTLET
RIM=105.30
INV(IN)=99.15
INV(OUT)=99.05

MONUMENT SET
EL. 105.98

EX. CB
RIM=106.31
INV(IN)=100.2
INV(OUT)=100.2

TH-04
MAY 27, 2015

U.P. 2/6

PR. STONE SUMP
SURFACE RUNOFF
TREATMENT SYSTEM
8 C2.1

VEGETATED COMPOST FILTER SOCK
TO BE LEFT IN PLACE POST
CONSTRUCTION (TYP.)
7 C2.2

PROJECT NOTES AND SPECIFICATIONS

APPLICABLE TO ALL THREE REMEDIATION SITES

1. ALL SURVEY INFORMATION OF EXISTING CONDITIONS, INCLUDING BUT NOT LIMITED TO PROPERTY LINES, FENCES, PAVING, OVERHEAD WIRES, ETC. ARE BASED ON THE ON DEDHAM GIS DATA LAYERS AND SITEOPS.COM DATA LAYERS.
2. THE CONTRACTOR SHALL NOTIFY AND COORDINATE ALL WORK WITH THE TOWN OF DEDHAM DPW AND THE RESPECTIVE UTILITY COMPANIES 48 HOURS PRIOR TO CONSTRUCTION.
3. THE CONTRACTOR SHALL REGISTER WITH "DIG SAFE" AT (888) DIG-SAFE, 72 HOURS PRIOR TO CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN "DIG SAFE" REGISTRATION AND "DIG SAFE" MARKINGS.
4. ALL WASTE MATERIAL SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL FEDERAL, STATE AND MUNICIPAL REGULATIONS.
5. ALL WORK SHALL COMPLY WITH FEDERAL, STATE AND MUNICIPAL REGULATIONS AND STANDARDS.
6. THE CONTRACTOR SHALL HAVE THE PROPER LICENSES AS REQUIRED BY THE TOWN OF DEDHAM AND ANY OTHER GOVERNING AGENCIES.
7. THE CONTRACTOR SHALL MAINTAIN CONSTRUCTION SIGNAGE DURING WORK WITHIN THE TOWN OF DEDHAM RIGHT-OF-WAY. THE CONTRACTOR SHALL ALSO MAINTAIN APPROPRIATE DETOUR SIGNS WHEN WORK WILL IMPEDE TRAFFIC FLOW AND PROVIDE POLICE TRAFFIC DETAIL WHEN REQUIRED BY STATE AND LOCAL POLICE AGENCIES.
8. ALL UTILITY RIMS SHALL BE ADJUSTED TO MEET FINAL GRADE AND SHALL CONFORM WITH THE CONSTRUCTION STANDARDS OF THE RESPECTIVE UTILITY COMPANY.
9. FILL SHALL BE PLACED IN NO GREATER THAN 6" LIFTS AND COMPACTED TO AT LEAST 95% OF MAXIMUM COMPACTION.
10. BITUMINOUS CONCRETE PAVING BASE COURSE (AGGREGATE BASE COURSE) IN EXISTING, FULL DEPTH PAVING AREAS AND NON-PAVED AREAS SHALL CONFORM TO M1.03.0 TYPE b, OF THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES: MassDOT - HIGHWAY STANDARD SPECIFICATIONS LATEST EDITION, WITH LESS THAN 8% BY WEIGHT PASSING THE NO. 200 SIEVE AND SHALL BE PLACED IN A MAXIMUM OF 6" THICK LIFTS.
11. BITUMINOUS CONCRETE PAVING SHALL CONFORM TO AASHTO M 20, M 81, AND M 140, ASTM D 1557; MASSACHUSETTS DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES: MassDOT - HIGHWAY STANDARD SPECIFICATIONS LATEST EDITION SPECIFICATIONS SECTIONS 460 (CLASS I) AND 405.
12. CATCH BASIN FRAME AND GRATE SHALL MEET DEDHAM DPW STANDARDS AND SHALL CONFORM TO ASTM 48.
13. STORM DRAINAGE MANHOLE FRAME AND COVER SHALL MEET DEDHAM DPW STANDARDS AND SHALL CONFORM TO ASTM 48.
14. THE CONTRACTOR SHALL VERIFY ALL EXISTING AND PROPOSED INVERTS AND LOCATIONS IN THE STREET PRIOR TO THE LAYING OF STORM DRAIN LINES.

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T 508.877.6688
F 508.877.8349
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NOTES

CONSTRUCTION DOCUMENTS

PROJECT

Neponset River Watershed Stormwater Runoff Mitigation

Dedham, Massachusetts

SEAL

REVISION

01	06 AUG 2015	Added utilities & inverts

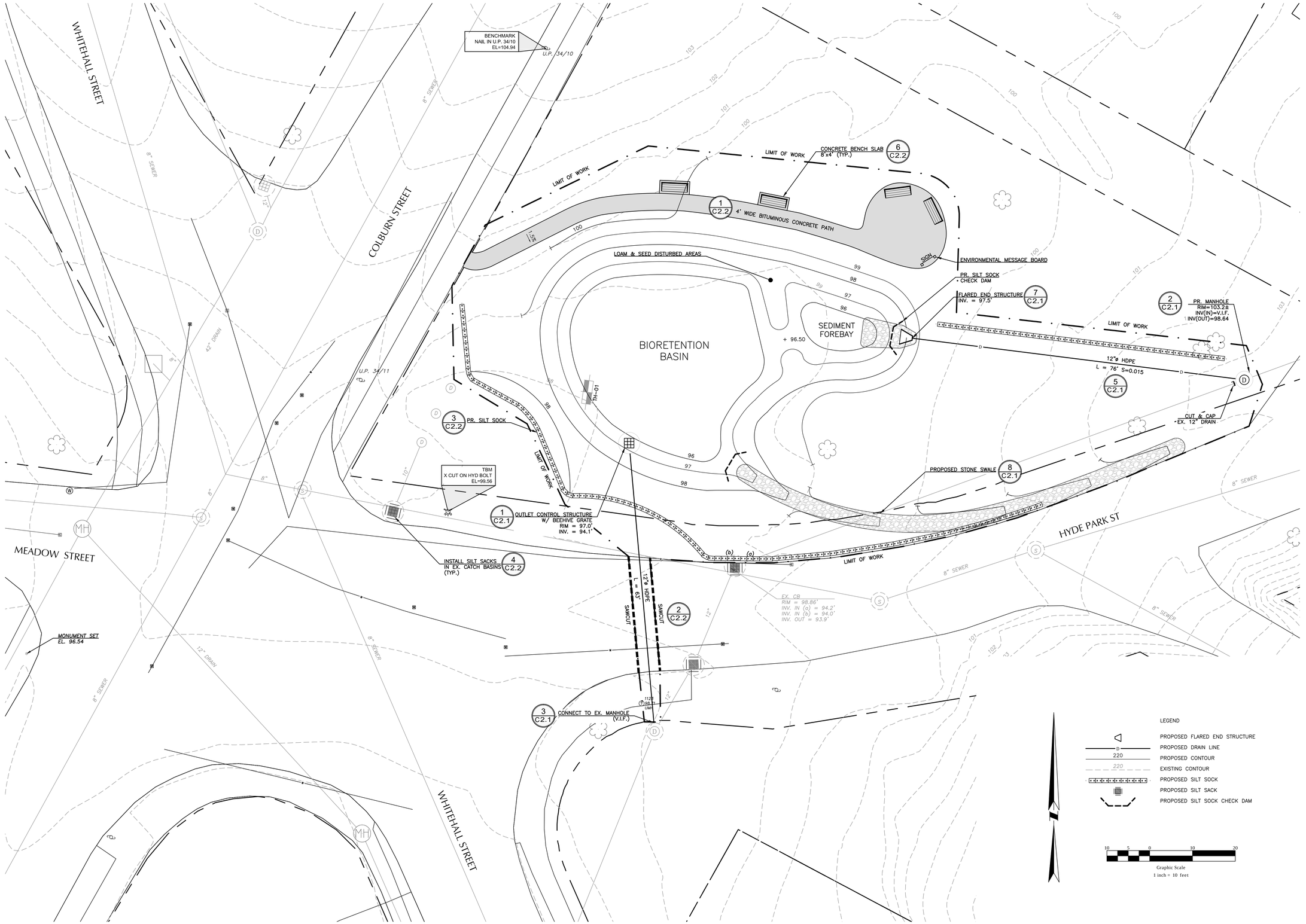
DRAWING TITLE:

SITE PLAN
AVERY STREET
DRAINAGE SWALE

JOB #: 15038.00
DATE: 06/30/2015
SCALE: as shown
DRAWN BY: PC
REVIEWED BY: AT

DRAWING NO:
C-1.1

FILE: 15038 neponsett rws stormwater runoff mitigation - rev 07aug2015.dwg



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REVISION

01	06 AUG 2015	Added utilities & inverts

DRAWING TITLE:

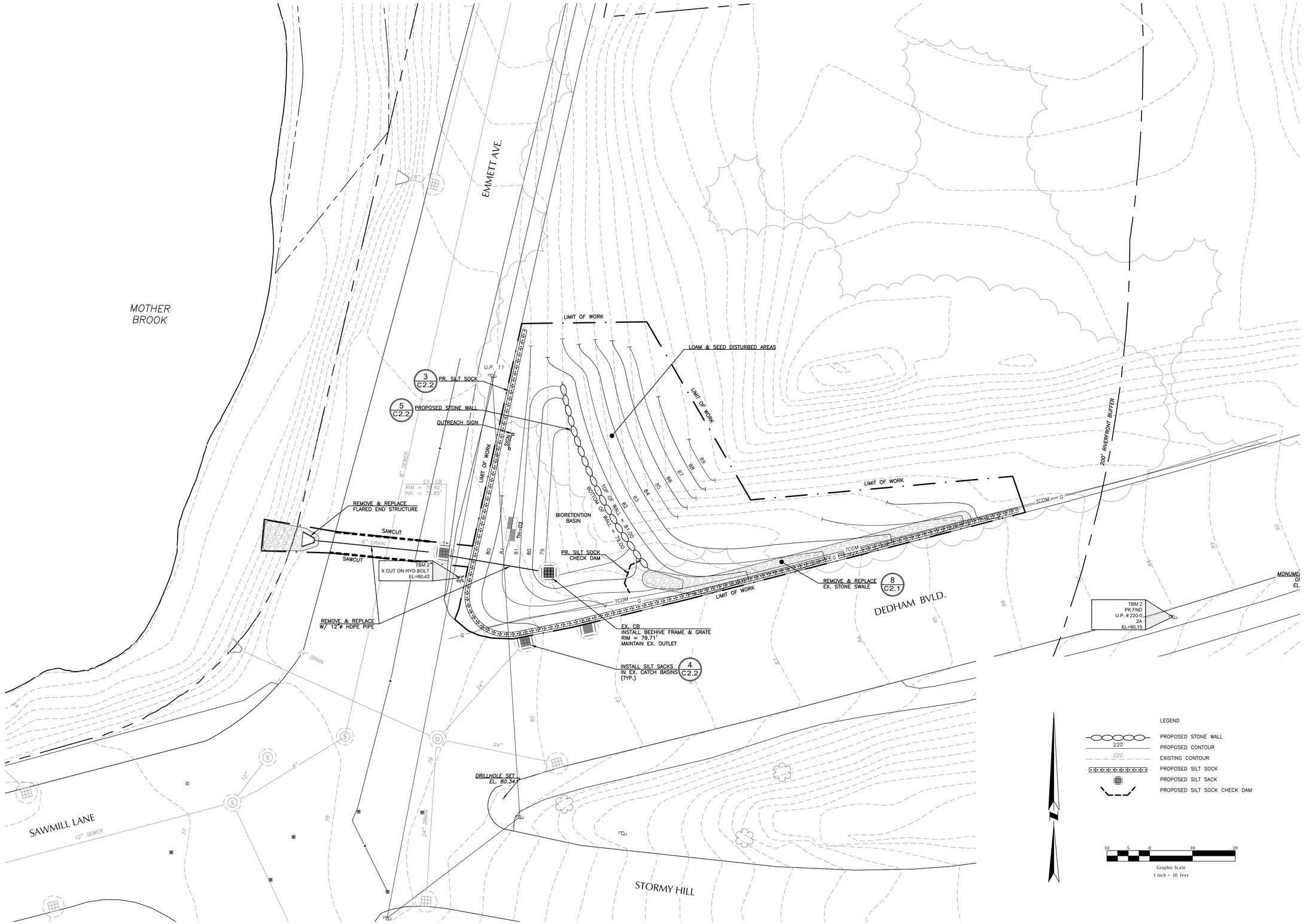
COLBURN STREET DETENTION BASIN

JOB #: 15038.00
DATE: 06/30/2015
SCALE: as shown
DRAWN BY: PC
REVIEWED BY: AT

DRAWING NO:

C-1.2

FILE: 15038 neponsett rws stormwater runoff mitigation - rev 05aug2015.dwg



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REVISION

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DRAWING TITLE:

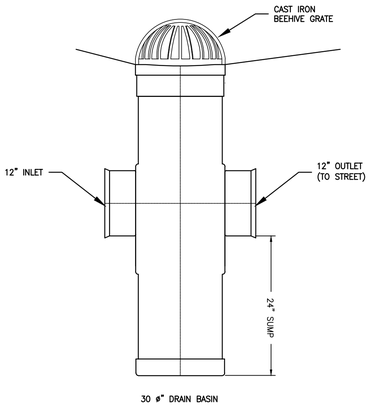
SAWMILL LANE DETENTION BASIN

JOB #: 15038.00
DATE: 06/30/2015
SCALE: as shown
DRAWN BY: PC
REVIEWED BY: AT

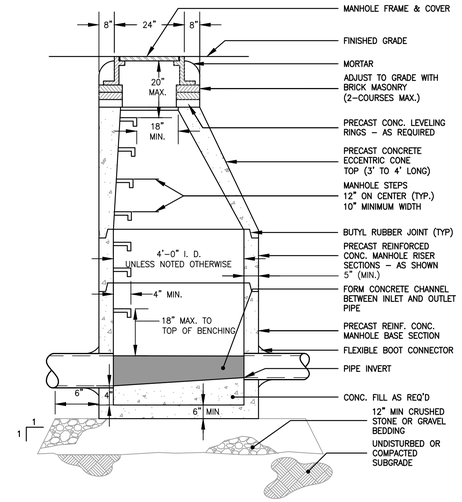
DRAWING NO:

C-1.3

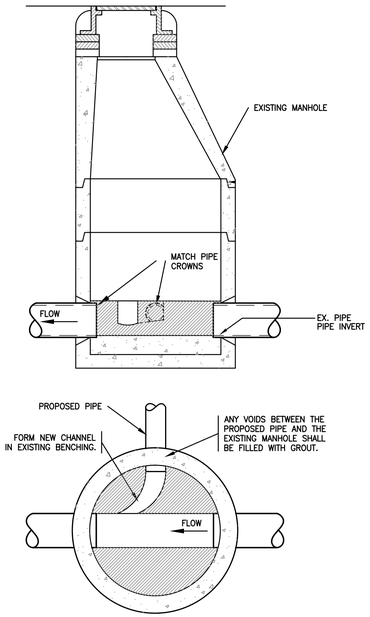
FILE: 15038 neponsett rws stormwater runoff mitigation - rev 05aug2015.dwg



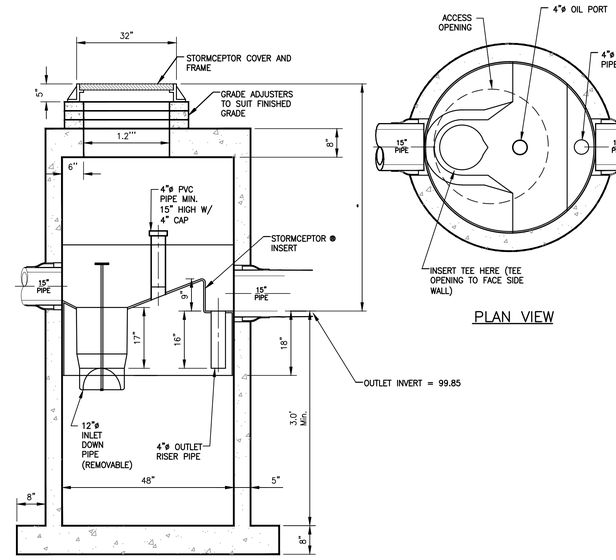
1 AREA DRAIN
NTS



2 PRECAST STORM DRAIN MANHOLE
NTS



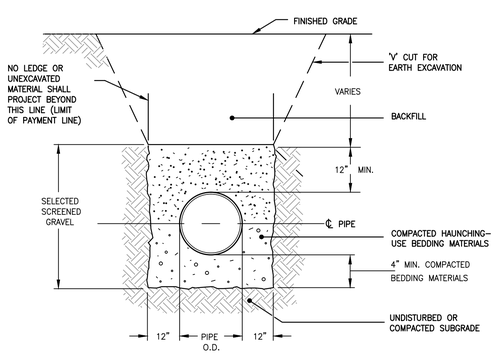
3 CONNECTION TO EX. DRAIN MH
NTS



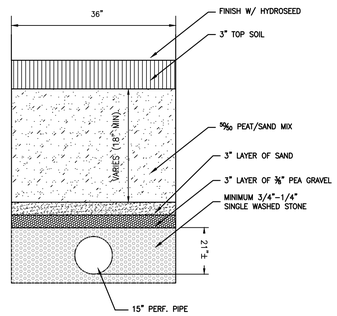
PLAN VIEW

SECTION THRU CHAMBER

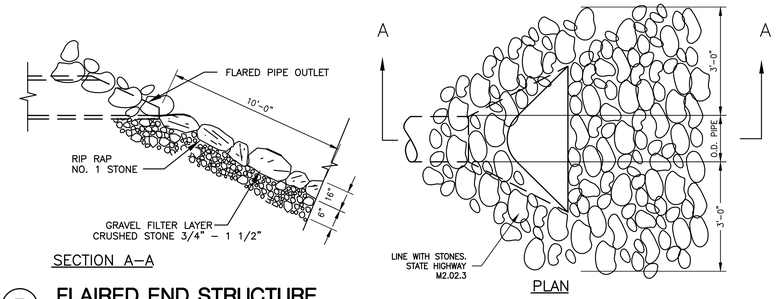
4 STC 450i PRECAST CONCRETE STORMCEPTOR
NTS



5 TRENCH SECTION- HDPE GRAVITY PIPE
NTS



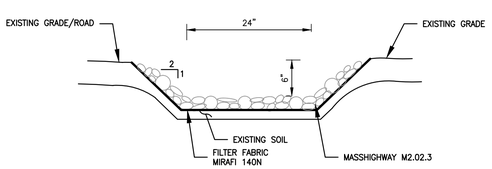
6 UNDERDRAIN
NTS



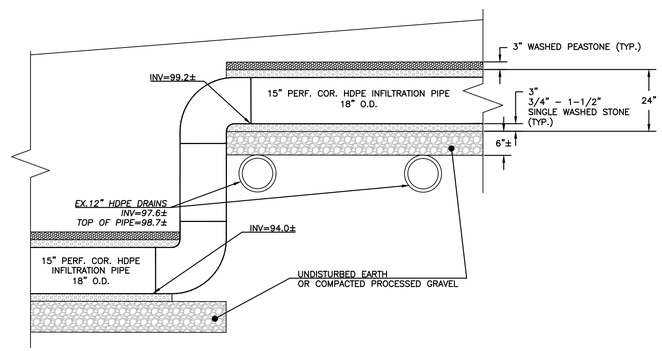
SECTION A-A

PLAN

7 FLAIRED END STRUCTURE
NTS



8 RIPRAP SWALE CROSS SECTION
NTS



9 INFILTRATION PIPE INVERT DROP AT CROSSING
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NOTES

CONSTRUCTION DOCUMENTS

PROJECT

Neponset River Watershed
Stormwater Runoff Mitigation
Dedham, Massachusetts

SEAL

REVISION

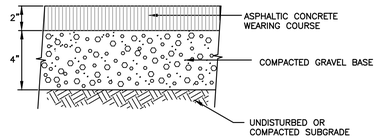
01	06 AUG 2015	Added utilities & inverts

DRAWING TITLE:

CIVIL
DETAILS

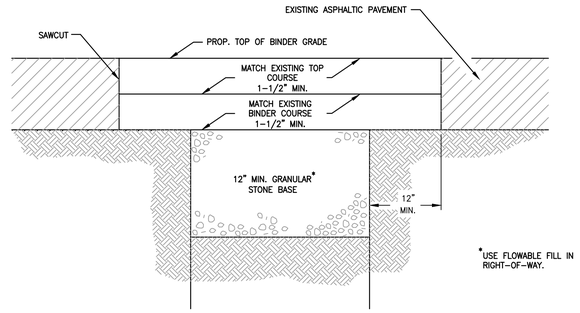
JOB #: 15038.00
DATE: 06/30/2015
SCALE: as shown
DRAWN BY: PC
REVIEWED BY: AT

DRAWING NO:
C-2.1



1 BITUMINOUS PAVEMENT (WALKWAY)

NTS



2 TRENCH PATCHING DETAIL

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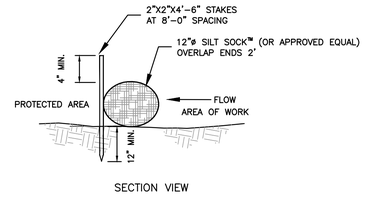
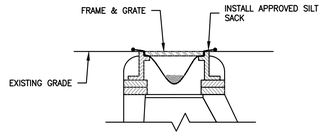


SECTION VIEW

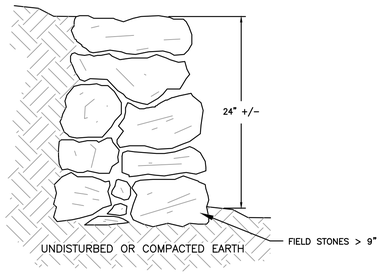
3 COMPOST SILT SOCK

NTS



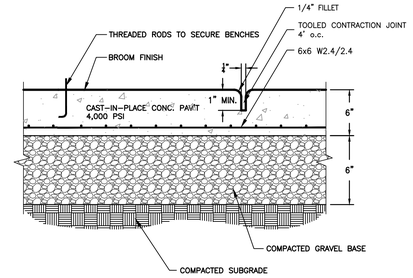
4 SILT SACKS

NTS



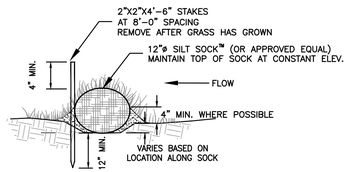
5 STONE WALL

NTS



6 CONCRETE BENCH SLAB

NTS



SECTION VIEW

7 COMPOST SILT SOCK CHECK-DAM

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DRAWING TITLE:

CIVIL DETAILS

JOB #: 15038.00
DATE: 06/30/2015
SCALE: as shown
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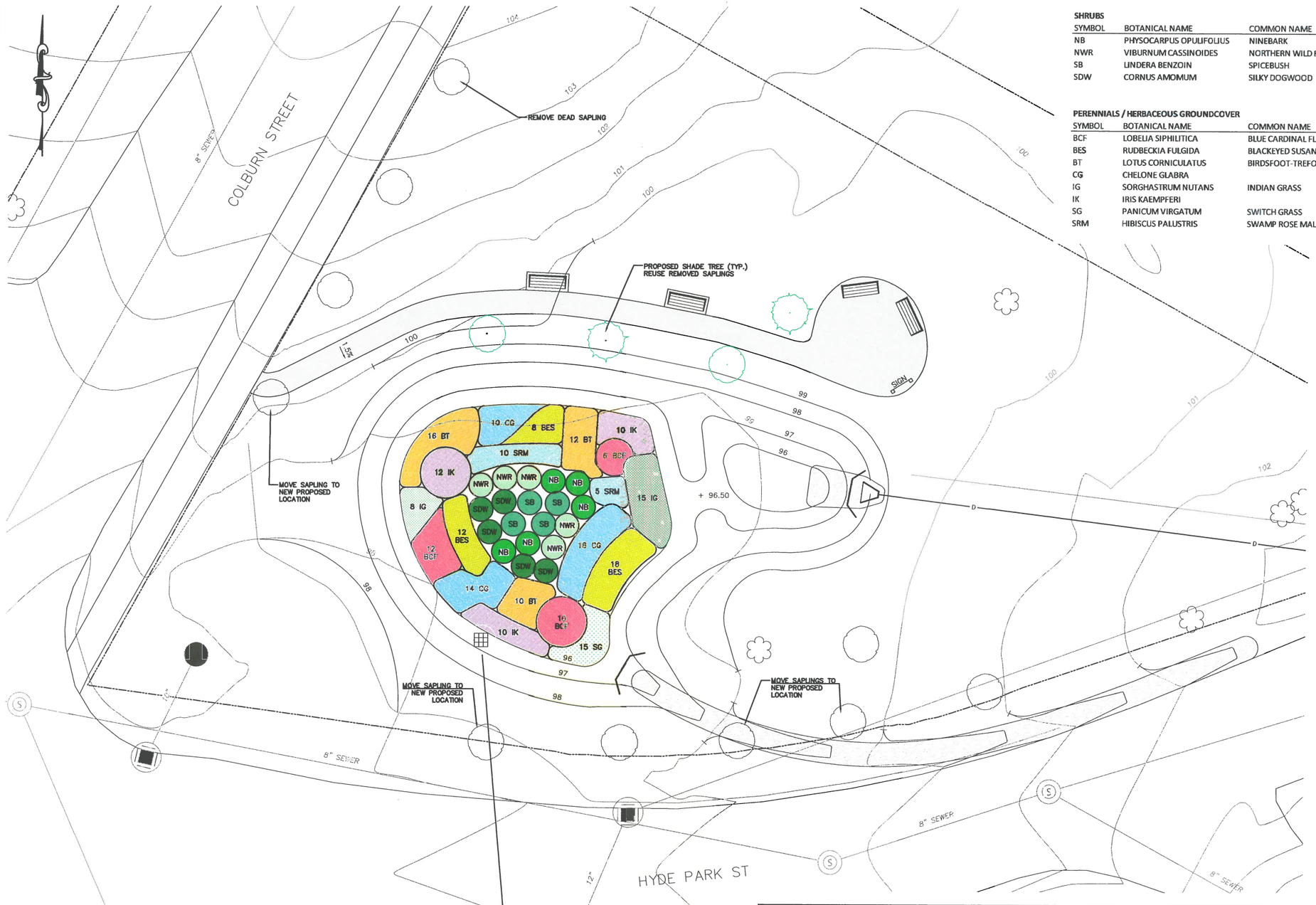
REVIEWED BY: AT

DRAWING NO:

C-2.2

FILE: 15038 neponsett rws stormwater runoff mitigation - rev 07aug2015.dwg

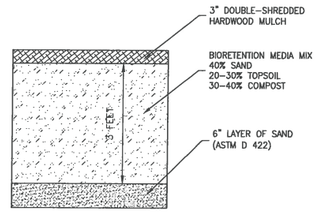


SHRUBS

SYMBOL	BOTANICAL NAME	COMMON NAME	BLOOM INFORMATION	QUANTITY	SIZE (GAL)
NB	PHYSOCARPUS OPULIFOLIUS	NINEBARK	MAY-JUNE; FOLIAGE/FRUIT IN FALL	5	5
NWR	VIBURNUM CASSINOIDES	NORTHERN WILD RASIN	LATE JUNE; FOLIAGE	5	5
SB	LINDERA BENZOIN	SPICEBUSH	MARCH; FOLIAGE; FRUIT LATE SUMMER	4	5
SDW	CORNUS AMOMUM	SILKY DOGWOOD	MID-JUNE; FRUIT IN SEPTEMBER	5	5

PERENNIALS / HERBACEOUS GROUNDCOVER

SYMBOL	BOTANICAL NAME	COMMON NAME	BLOOM INFORMATION	QUANTITY	SIZE (GAL)
BCF	LOBELIA SIPHILITICA	BLUE CARDINAL FLOWER	JULY-SEPTEMBER	28	1
BES	RUDBECKIA FULGIDA	BLACKEYED SUSAN	JULY-OCTOBER	38	1
BT	LOTUS CORNICULATUS	BIRDSFOOT-TREFOIL	JUNE-SEPTEMBER	38	1
CG	CHELONE GLABRA		LATE SUMMER - EARLY FALL	42	1
IG	SORGHASTRUM NUTANS	INDIAN GRASS	N/A	23	1
IK	IRIS KAEMPFERI		SUMMER	32	1
SG	PANICUM VIRGATUM	SWITCH GRASS	N/A	15	1
SRM	HIBISCUS PALUSTRIS	SWAMP ROSE MALLOW	JULY-SEPTEMBER	15	1



BIORETENTION CROSS SECTION

COMMONWEALTH OF MASSACHUSETTS
JASON L. MAMMONE
CIVIL
NO. 45882
REGISTERED PROFESSIONAL ENGINEER
7/22/15

REV.	DATE	DESCRIPTION	APP'D

DESIGNED BY: NSB
DRAWN BY: NSB
CHECKED BY: JLM
DATE: 7/22/2015
SCALE: 1" = 8'
PROJECT NUMBER: 15-02, 319

NEPONSET RIVER WATERSHED STORMWATER RUNOFF MITIGATION - COLBURN ST LANDSCAPING PLAN

TOWN OF DEDHAM
ENGINEERING DEPARTMENT
55 RIVER STREET, DEDHAM, MA 02026 - (781) 751-9350

0 4 8 16 32
GRAPHIC SCALE (FEET)

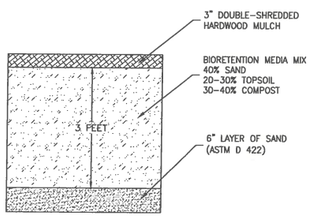
DRAWING NO.: 01.1

SHRUBS

SYMBOL	BOTANICAL NAME	COMMON NAME	BLOOM INFORMATION	QUANTITY	SIZE (GAL)
RC	ARONIA/PYRUS ARBUTIFOLIA	RED CHOKEBERRY	EARLY SPRING; FRUIT & FOLIAGE FALL-WINTER	4	5

PERENNIALS / HERBACEOUS GROUNDCOVER

SYMBOL	BOTANICAL NAME	COMMON NAME	BLOOM INFORMATION	QUANTITY	SIZE (GAL)
BCF	LOBELIA SIPHILITICA	BLUE CARDINAL FLOWER	JULY-SEPTEMBER	10	1
BS	ANDROPOGON VIRGNICUS	BROOMSEDGE	N/A	6	1
BT	LOTUS CORNICULATUS	BIRDSFOOT-TREFOIL	JUNE-SEPTEMBER	14	1
CG	CHELONE GLABRA		LATE SUMMER - EARLY FALL	16	1
IK	IRIS KAEMPFERI		SUMMER	11	1
SG	PANICUM VERGATUM	SWITCHGRASS	N/A	10	1



BIORETENTION CROSS SECTION

COMMONWEALTH OF MASSACHUSETTS
JASON L. MAMMONE
CIVIL
No. 45882
REGISTERED PROFESSIONAL ENGINEER
7/22/15

REV.	DATE	DESCRIPTION	APP'D

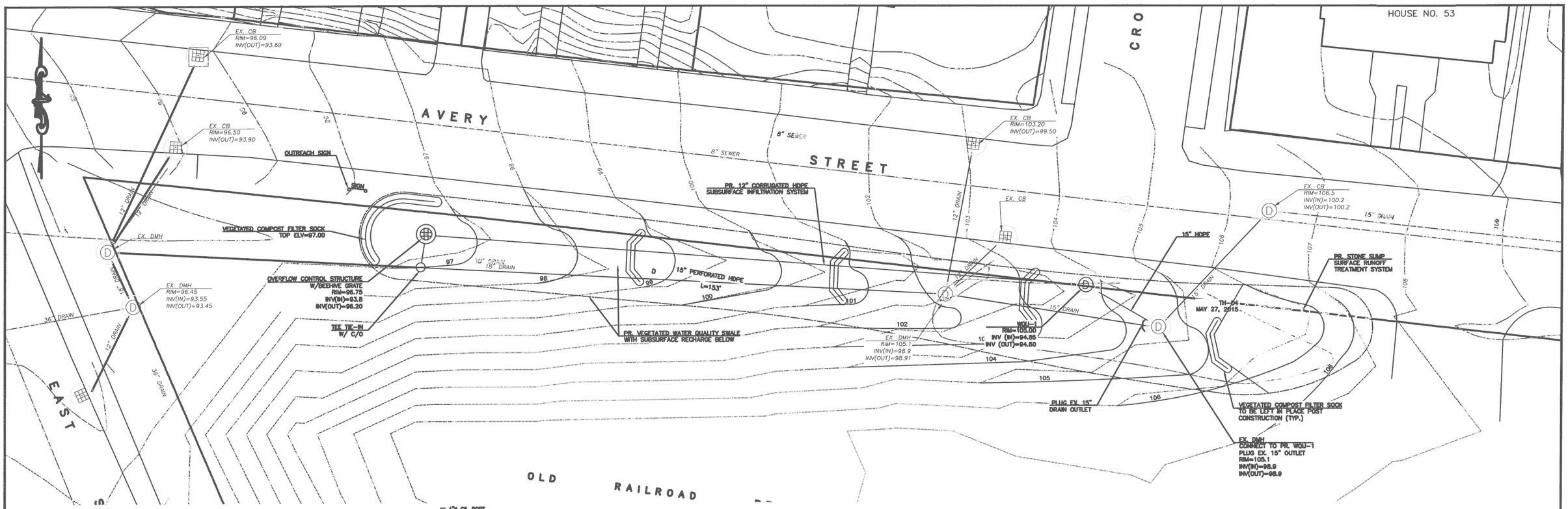
DESIGNED BY: NSB
DRAWN BY: NSB
CHECKED BY: JLM
DATE: 7/22/2015
SCALE: 1" = 5'
PROJECT NUMBER: 15-02, 319

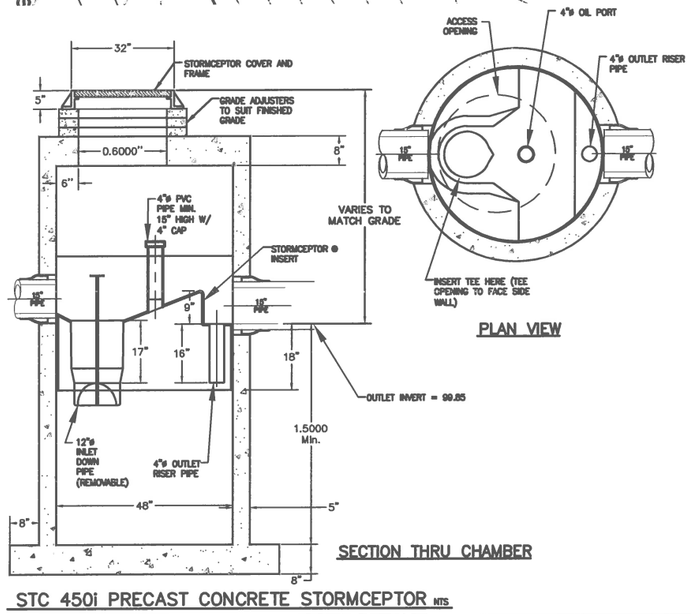
NEPONSET RIVER WATERSHED STORMWATER RUNOFF MITIGATION - SAWMILL LN LANDSCAPING PLAN

TOWN OF DEDHAM
ENGINEERING DEPARTMENT
55 RIVER STREET, DEDHAM, MA 02026 - (781) 751-9350

0 2.5 5 10 20
GRAPHIC SCALE (FEET)

DRAWING NO.: 01.1

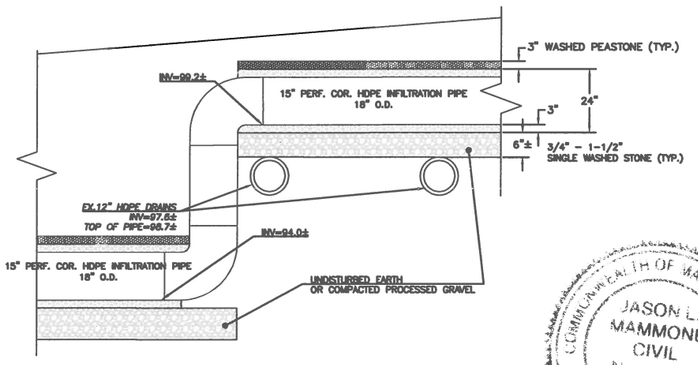




STC 450i PRECAST CONCRETE STORMCEPTOR NTS

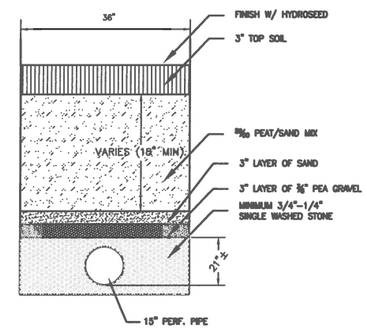
PLAN VIEW

SECTION THRU CHAMBER



INFILTRATION PIPE INVERT DROP AT CROSSING

NTS



UNDERDRAIN

NTS

COMMONWEALTH OF MASSACHUSETTS
JASON L. MAMMONE
CIVIL
NO. 45882
REGISTERED
PROFESSIONAL ENGINEER
5/18/17

319 NPS POLLUTION GRANTS PROGRAM
DEDHAM MOTHER BROOK BMPs
OPERATION AND MAINTENANCE PLAN

AS-BUILT - AVERY STREET WQ SWALE 5/15/2017

TOWN OF DEDHAM
ENGINEERING DEPARTMENT
55 RIVER STREET, DEDHAM, MA 02026 - (781) 751-9350

1" = 20' GRAPHIC SCALE (FEET) 0 5 10 20 30

PROJECT NUMBER: 15-02, 319

COLBURN STREET

HYDE PARK ST

CONCRETE BENCH SLAB
8'x4' (TYP.)

4' WIDE BITUMINOUS CONCRETE PATH

1.5%

ENVIRONMENTAL MESSAGE BOARD

FLARED END STRUCTURE
INV. = 97.5'

SEDIMENT
FOREBAY

+ 96.50

12"ø HDPE
L = 76'

STONE SWALE

12"ø HDPE

OUTLET CONTROL STRUCTURE
W/ BEEHIVE GRATE
RIM = 97.0'
INV. = 94.1'

EX. CB
RIM = 98.2'
INV. IN (s) = 94.2'
INV. IN (s) = 94.0'
INV. OUT = 93.9'

8" SEWER

12" DRAIN

6" SEWER

3" DOUBLE-SHREDDED
HARDWOOD MULCH

BIORETENTION MEDIA MIX
40% SAND
20-30% TOPSOIL
30-40% COMPOST

3 FEET

6" LAYER OF SAND
(ASTM D 422)

BIORETENTION CROSS SECTION

COMMONWEALTH OF MASSACHUSETTS
JASON L. MAMMONE
CIVIL
No. 45882
REGISTERED PROFESSIONAL ENGINEER

5/18/17

319 NPS POLLUTION GRANTS PROGRAM
DEDHAM MOTHER BROOK BMPs
OPERATION AND MAINTENANCE PLAN

AS-BUILT - COLBURN STREET BIORETENTION

5/15/2017

TOWN OF DEDHAM
ENGINEERING DEPARTMENT
55 RIVER STREET, DEDHAM, MA 02026 - (781) 751-9350

1" = 20'

0 5 10 20 30
GRAPHIC SCALE (FEET)

PROJECT NUMBER:
15-02, 319

MOTHER BROOK

EMMETT AVE.

STONE WALL

OUTREACH SIGN

SIGN

REMOVE & REPLACE FLARED END STRUCTURE

BIORETENTION BASIN

REMOVE & REPLACE W/ 12"ø HDPE PIPE

REMOVE & REPLACE EX. STONE SWALE

EX. CB
INSTALL BEEHIVE FRAME & GRATE
RIM = 80.5'
MAINTAIN EX. OUTLET

DEDHAM BVLD.

SAWMILL LANE

12" SEWER

STORMY HILL

24" DRAIN

200' RIVERFRONT BUFFER

3" DOUBLE-SHREDDED HARDWOOD MULCH

BIORETENTION MEDIA MIX
40% SAND
20-30% TOPSOIL
30-40% COMPOST

3 FEET

6" LAYER OF SAND (ASTM D 422)

BIORETENTION CROSS SECTION

COMMONWEALTH OF MASSACHUSETTS
JASON L. MAMMONE
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5/18/17

319 NPS POLLUTION GRANTS PROGRAM
DEDHAM MOTHER BROOK BMPs
OPERATION AND MAINTENANCE PLAN

AS-BUILT - SAWMILL LANE BIORETENTION

5/15/2017

TOWN OF DEDHAM
ENGINEERING DEPARTMENT
55 RIVER STREET, DEDHAM, MA 02026 - (781) 751-9350

1" = 20'

0 5 10 20 30
GRAPHIC SCALE (FEET)

PROJECT NUMBER:
15-02, 319

May 25, 2017

Town of Dedham
ATTN: Jason Mammone, Director of Engineering
55 River Street
Dedham, Massachusetts 02026

Re: Certification Letter
Neponset River Watershed Remediation

SCI # 15038.00

Dear Jason:

On Tuesday May 22, 2017 Samiotes Consultants, Inc. (Samiotes) conducted final inspections of the Best Management Practices (BMP's) at the three sites associated with the Neponset River Watershed Stormwater Improvements Program (See pictures on Pages 2 & 3). The three sites are:

1. Public Park at the corner of Colburn and Hyde Park Streets
2. Green space at the corner of Emmet Avenue and Dedham Boulevard
3. Roadside of Avery Street

Based on our observations and inspections we have concluded that all three BMP installations have been completed substantially in accordance with the original design concept and construction plans.

If you have any questions, or require further information, please do not hesitate to call me at (508) 877-6688 ext. 25 or Andy Truman at ext. 11.

Sincerely,

Paul Carey

Paul Carey, PE
Civil Engineer

Samiotes Consultants, Inc.
Civil Engineers + Land Surveyors

20 A Street
Framingham, MA 01701

T 508.877.6688
F 508.877.8349

www.samiotes.com

Figure 1 – Inlets to Colburn Street Bio-retention Basin

Figure 2 – Colburn Street Inlet Channel

Figure 3 – Emmet Avenue Bio-retention Basin. Rip-Rap Inlet and Outlet Control Structure in Background

Figure 4 – Emmet Avenue Bio-retention Basin Outlet Control Structure

Figure 5 – Stone pretreatment sump at Avery Street Inlet

Figure 6 – Avery Street Water Quality Swale with Subsurface Recharge Below

Figure 7 – Stormceptor at Avery Street. Treats Avery Street Runoff

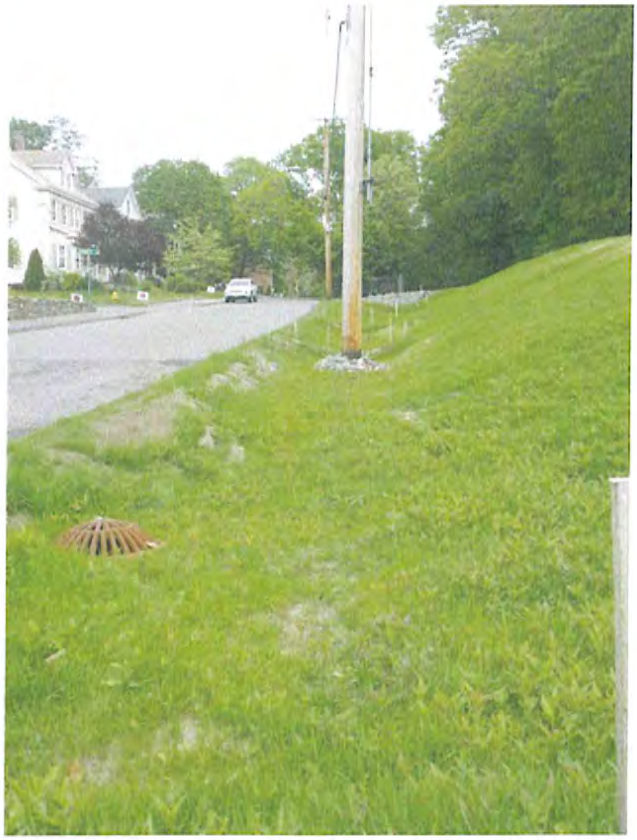


Figure 8 – Outlet Structure at Avery Street to Dedham Drain System


GRADALL

F2. Attachments

Deliverables Task 3: O and M Plan

TOWN OF DEDHAM

Commonwealth of Massachusetts

Best Management Practice Operation and Maintenance (O&M) Plan

319 Non-Point Source Pollution Grants Program
Dedham Mother Brook BMP Implementation Project
March 2017

This document provides operation and maintenance (O&M) guidance, schedules, and checklists for the stormwater best management practices (BMPs) installed in 2015 and 2016 as part of the 319 Non-Point Source Pollution Dedham Mother Brook BMP Implementation Project. The three BMPs installed consist of:

- A bioretention basin at the intersection of Colburn Street and Hyde Park Street
- A bioretention basin at the intersection of Sawmill Lane / Dedham Boulevard and Emmett Avenue
- A combined water quality swale and subsurface infiltration BMP at the intersection of Avery Street and East Street

A locus map is provided in Figure 1.

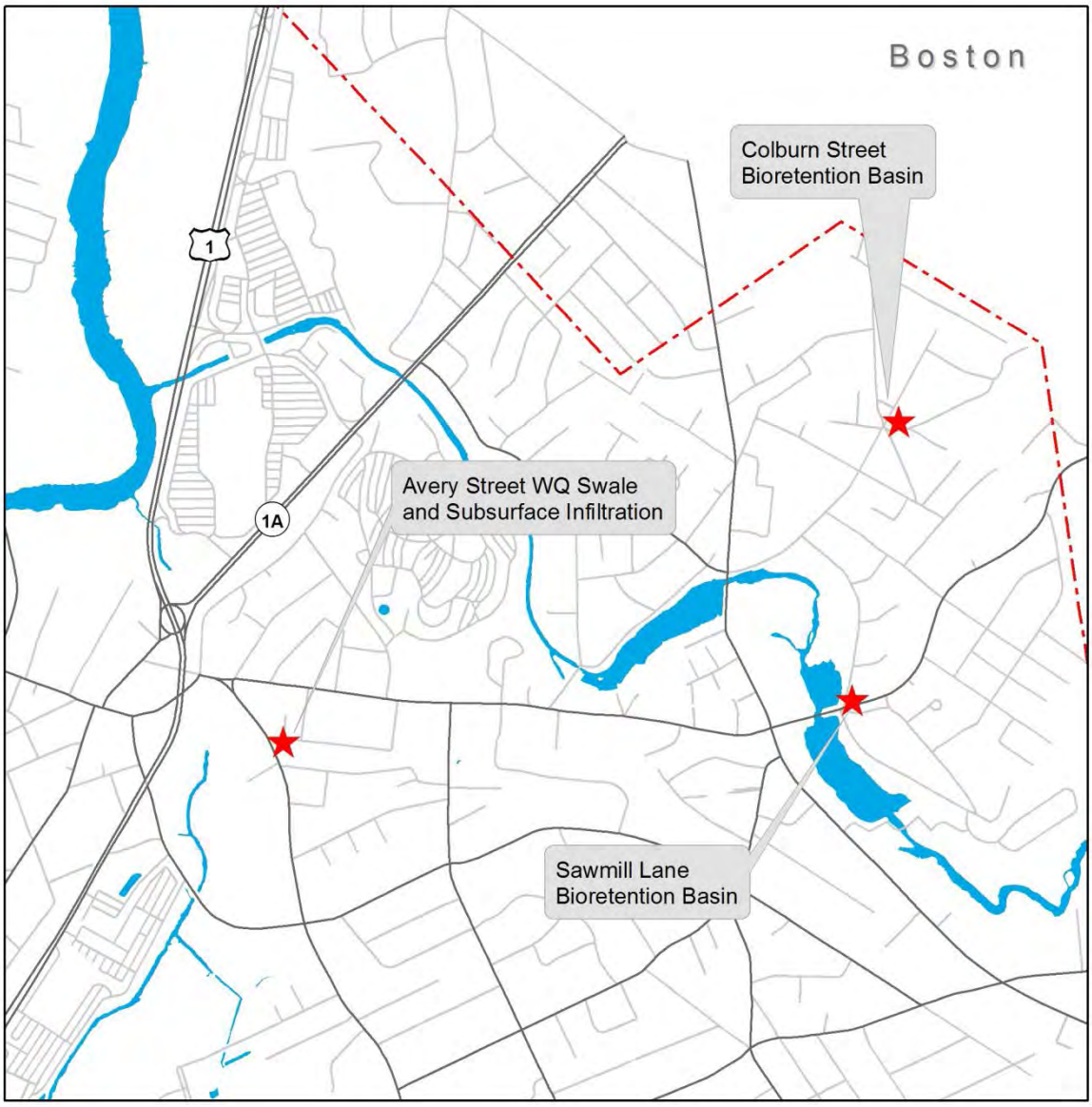


Figure 1. Best management practice (BMP) locations

All three BMPs are located on Town-owned right-of-ways or parcels and these properties will not change ownership. Table 1 defines the responsible parties for various O&M tasks. The annual O&M budget is provided in Table 2. The semi-annual inspections will be performed by Engineering Department personnel as part of their regular duties. The other O&M tasks will be funded by the Department of Public Work's annual operating budget.

Table 1. Operation and Maintenance Responsibilities

O&M Task	Responsible Party
Semi-Annual Inspections	Engineering Department
Planting and Structural Maintenance	Department of Public Works
Routine Mowing	Department of Public Works

Table 2. Annual Operation and Maintenance Budget

O&M Task	Annual Cost
Colburn Street Bioretention	
Mowing	$150
Mulching, plant maintenance and replacement, debris removal	$1,000
Sediment removal (forebays, structures)	$1,000
Media replacement (spread over 5 yrs)	$500
Inspections	$150
Subtotal	*$2,700*
Sawmill Lane Bioretention	
Mowing	$150
Mulching, plant maintenance and replacement, debris removal	$800
Sediment removal (forebays, structures)	$500
Media replacement (spread over 5 yrs)	$400
Inspections	$150
Subtotal	*$2,000*
Avery Street WQ Swale and Subsurface Infiltration BMP	
Mowing	$150
Sediment removal (forebays, structures)	$1,000
Stormceptor	$200
Media replacement (spread over 5 yrs)	$500
Inspections	$150
Subtotal	*$2,000*
Total	**$6,700**

The following figures (Figures 2-6) provide detailed illustrations of each BMP. The landscaping plans for the bioretention BMPs are provided as Figures 3 and 5 to aid in maintenance and replacement of plantings. An operation and maintenance log and schedule is provided as Attachment A. Inspection and maintenance checklists for each BMP are provided as Attachment B. A Stormceptor water quality unit is included in the design for the Avery Street BMP. The Stormceptor manufacturer provides additional O&M guidance which has been provided as Attachment C.

COLBURN STREET

8" SEWER

CONCRETE BENCH SLAB
8'x4' (TYP.)

4' WIDE BITUMINOUS CONCRETE PATH

1.5%

ENVIRONMENTAL MESSAGE BOARD

FLARED END STRUCTURE
INV. = 97.5'

SEDIMENT
FOREBAY

+ 96.50

12"ø HDPE
L = 78'

STONE SWALE

OUTLET CONTROL STRUCTURE
W/ BEEHIVE GRATE
RIM = 97.0'
INV. = 94.1'

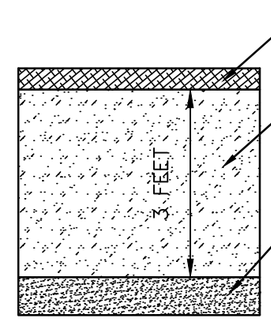
12"ø HDPE

EX. CB
RIM = 98.2'
INV. IN (a) = 94.2'
INV. IN (b) = 94.0'
INV. OUT = 93.9'

HYDE PARK ST

8" SEWER

12" DRAIN



BIORETENTION CROSS SECTION

319 NPS POLLUTION GRANTS PROGRAM
DEDHAM MOTHER BROOK BMPs
OPERATION AND MAINTENANCE PLAN

FIGURE 2. COLBURN STREET BIORETENTION 3/2/2017

TOWN OF DEDHAM
ENGINEERING DEPARTMENT
55 RIVER STREET, DEDHAM, MA 02026 - (781) 751-9350

1" = 20' 0 5 10 20 30 GRAPHIC SCALE (FEET)

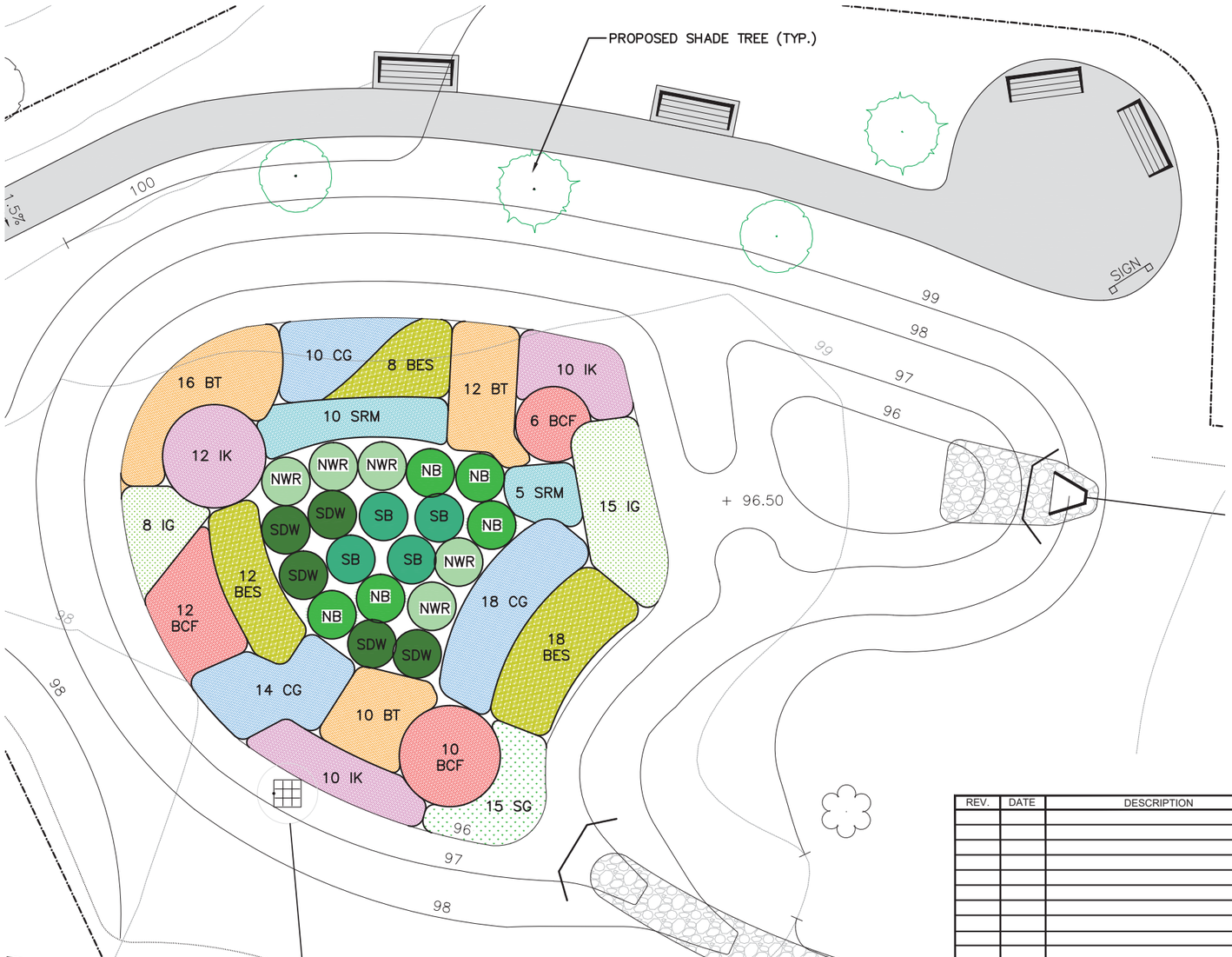
PROJECT NUMBER:
15-02, 319

SHRUBS

SYMBOL	BOTANICAL NAME	COMMON NAME	BLOOM INFORMATION	QUANTITY	SIZE (GAL)
NB	PHYSOCARPUS OPULIFOLIUS	NINEBARK	MAY-JUNE; FOLIAGE/FRUIT IN FALL	5	5
NWR	VIBURNUM CASSINOIDES	NORTHERN WILD RASIN	LATE JUNE; FOLIAGE	5	5
SB	LINDERA BENZOIN	SPICEBUSH	MARCH; FOLIAGE; FRUIT LATE SUMMER	4	5
SDW	CORNUS AMOMUM	SILKY DOGWOOD	MID-JUNE; FRUIT IN SEPTEMBER	5	5

PERENNIALS / HERBACEOUS GROUNDCOVER

SYMBOL	BOTANICAL NAME	COMMON NAME	BLOOM INFORMATION	QUANTITY	SIZE (GAL)
BCF	LOBELIA SIPHILITICA	BLUE CARDINAL FLOWER	JULY-SEPTEMBER	28	1
BES	RUDBECKIA FULGIDA	BLACKEYED SUSAN	JULY-OCTOBER	38	1
BT	LOTUS CORNICULATUS	BIRDSFOOT-TREFOIL	JUNE-SEPTEMBER	38	1
CG	CHELONE GLABRA		LATE SUMMER - EARLY FALL	42	1
IG	SORGHASTRUM NUTANS	INDIAN GRASS	N/A	23	1
IK	IRIS KAEMPFERI		SUMMER	32	1
SG	PANICUM VIRGATUM	SWITCH GRASS	N/A	15	1
SRM	HIBISCUS PALUSTRIS	SWAMP ROSE MALLOW	JULY-SEPTEMBER	15	1



REV.	DATE	DESCRIPTION	APP'D

DESIGNED BY: NSB
DRAWN BY: NSB
CHECKED BY: JLM
DATE: 7/22/2015
SCALE: 1" = 5'
PROJECT NUMBER: 15-02, 319

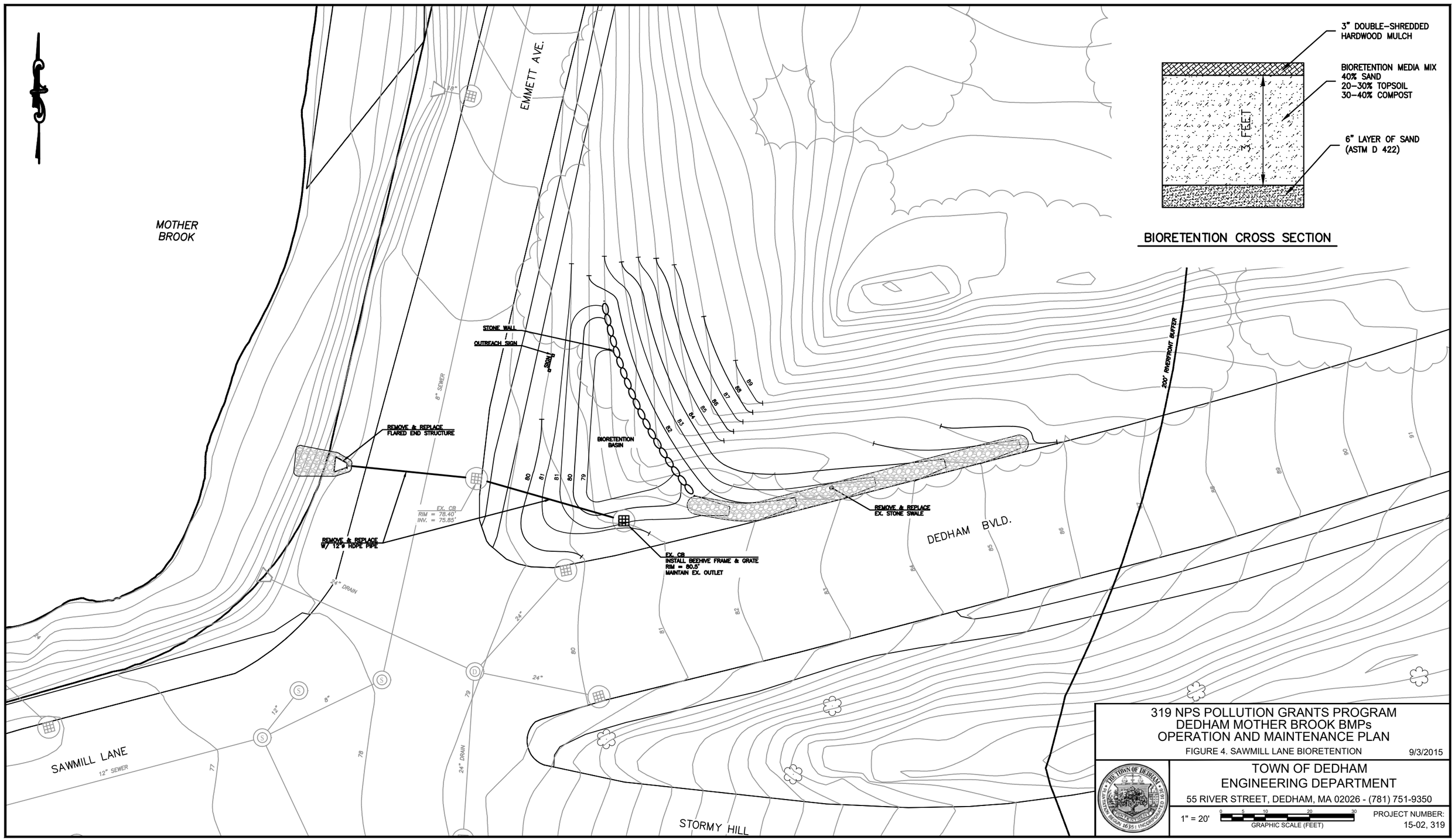
NEPONSET RIVER WATERSHED STORMWATER RUNOFF MITIGATION - COLBURN ST LANDSCAPING PLAN

TOWN OF DEDHAM
ENGINEERING DEPARTMENT
55 RIVER STREET, DEDHAM, MA 02026 - (781) 751-9350

0 2.5 5 10 20
GRAPHIC SCALE (FEET)

DRAWING NO.: 01.1
SHEET 1 OF 1

Figure 3. Colburn Street Planting Plan



BIORETENTION CROSS SECTION

319 NPS POLLUTION GRANTS PROGRAM
DEDHAM MOTHER BROOK BMPs
OPERATION AND MAINTENANCE PLAN

FIGURE 4. SAWMILL LANE BIORETENTION

9/3/2015

TOWN OF DEDHAM
ENGINEERING DEPARTMENT
55 RIVER STREET, DEDHAM, MA 02026 - (781) 751-9350

1" = 20'

0 5 10 20 30
GRAPHIC SCALE (FEET)

PROJECT NUMBER:
15-02, 319

SHRUBS

SYMBOL	BOTANICAL NAME	COMMON NAME	BLOOM INFORMATION	QUANTITY	SIZE (GAL)
RC	ARONIA/PYRUS ARBUTIFOLIA	RED CHOKEBERRY	EARLY SPRING; FRUIT & FOLIAGE FALL-WINTER	4	5

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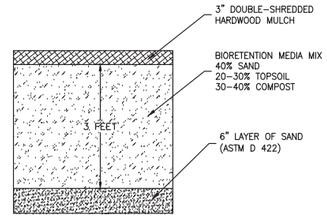
SYMBOL	BOTANICAL NAME	COMMON NAME	BLOOM INFORMATION	QUANTITY	SIZE (GAL)
BCF	LOBELIA SIPHILITICA	BLUE CARDINAL FLOWER	JULY-SEPTEMBER	10	1
BS	ANDROPOGON VIRGNICUS	BROOMSEDGE	N/A	6	1
BT	LOTUS CORNICULATUS	BIRDSFOOT-TREFOIL	JUNE-SEPTEMBER	14	1
CG	CHELONE GLABRA		LATE SUMMER - EARLY FALL	16	1
IK	IRIS KAEMPFERI		SUMMER	11	1
SG	PANICUM VERGATUM	SWITCHGRASS	N/A	10	1



BIORETENTION CROSS SECTION

REV.	DATE	DESCRIPTION	APP'D

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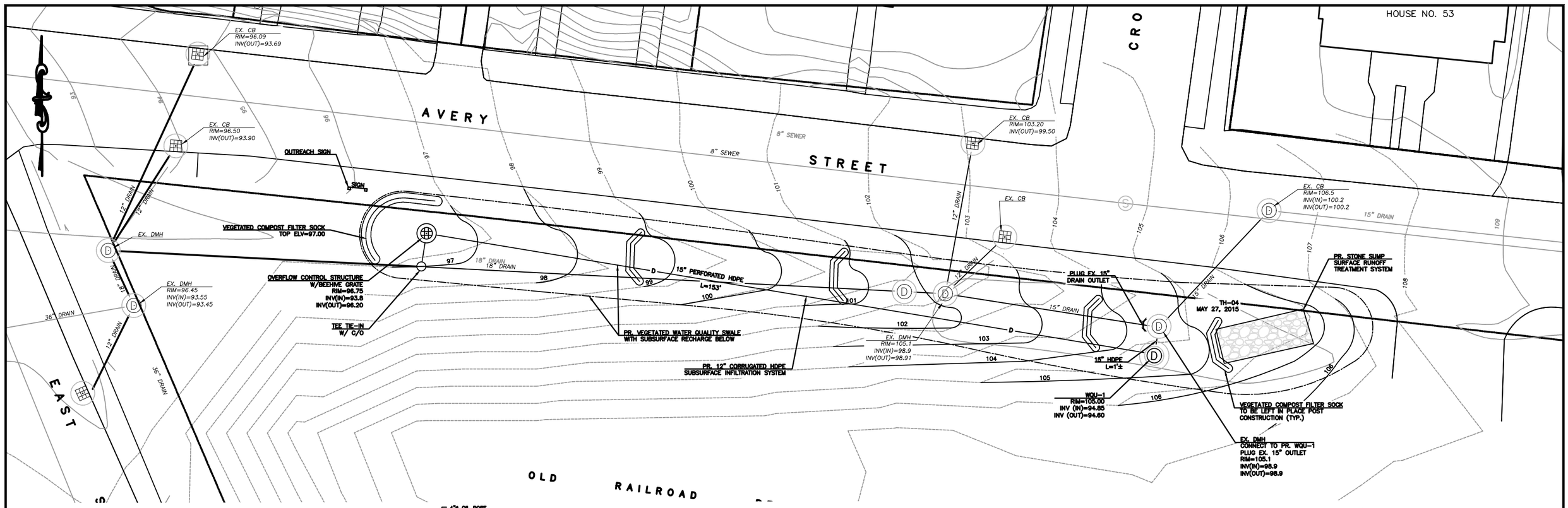
NEPONSET RIVER WATERSHED STORMWATER RUNOFF MITIGATION - SAWMILL LN LANDSCAPING PLAN

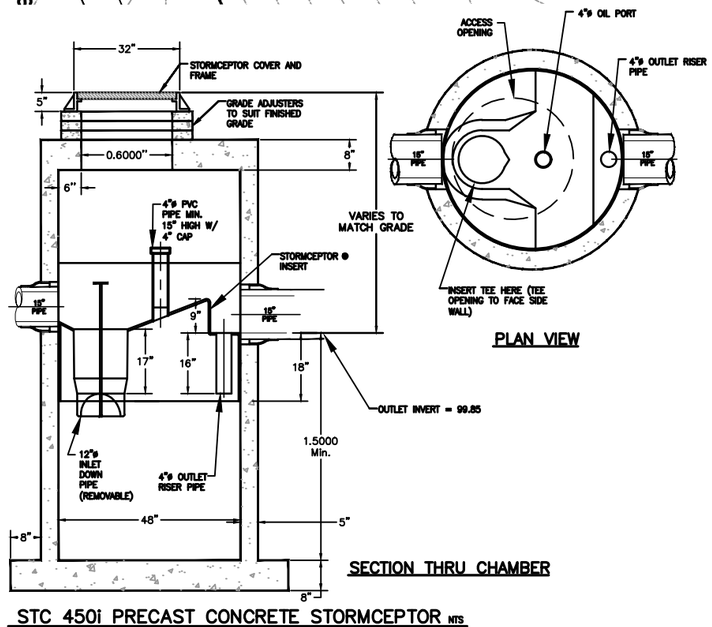
TOWN OF DEDHAM
ENGINEERING DEPARTMENT
55 RIVER STREET, DEDHAM, MA 02026 - (781) 751-9350

0 2.5 5 10 20
GRAPHIC SCALE (FEET)

DRAWING NO.: 01.1
SHEET 2 OF 2

Figure 5. Sawmill Planting Plan

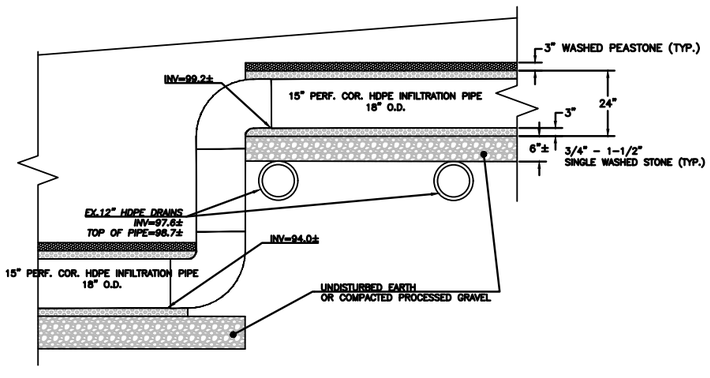




PLAN VIEW

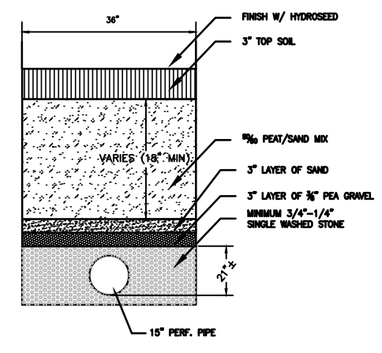
SECTION THRU CHAMBER

STC 450i PRECAST CONCRETE STORMCEPTOR NTS



INFILTRATION PIPE INVERT DROP AT CROSSING

NTS



UNDERDRAIN

NTS

319 NPS POLLUTION GRANTS PROGRAM
DEDHAM MOTHER BROOK BMPs
OPERATION AND MAINTENANCE PLAN

FIGURE 6. AVERY STREET WQ SWALE 3/2/2017

TOWN OF DEDHAM
ENGINEERING DEPARTMENT
55 RIVER STREET, DEDHAM, MA 02026 - (781) 751-9350

1" = 20' GRAPHIC SCALE (FEET) 0 5 10 20 30

PROJECT NUMBER: 15-02, 319

Attachment A

BMP Inspection Log and Schedule

TOWN OF DEDHAM

Commonwealth of Massachusetts

319 Non-Point Source Pollution Grants Program

Dedham Mother Brook Best Management Practice Implementation Project

Best Management Practice (BMP) Inspection Log

BMPs should be inspected twice per year and after any large storm events. One of the inspections should occur during early spring to ensure plantings and mulch are sufficient and any damage during snow removal operations is corrected. This log and inspection records should remain on file for 3 years.

Colburn Street Bioretention Inspection Dates:		**Sawmill Lane Bioretention Inspection Dates:**		**Avery Street WQ Swale Inspection Dates:**	
Inspector Initials	Date	Inspector Initials	Date	Inspector Initials	Date

Attachment B

Inspection and Maintenance Checklist

TOWN OF DEDHAM

Commonwealth of Massachusetts

319 Non-Point Source Pollution Grants Program

Dedham Mother Brook Best Management Practice Implementation Project

Best Management Practice (BMP) Inspection Checklist

BMPs should be inspected twice per year and after any large storm events. One of the inspections should occur during early spring to ensure plantings and mulch are sufficient and any damage during snow removal operations is corrected. After each component is inspected, place a checkmark in the corresponding box. Not any problems in the "Deficiencies" column. After the problems are corrected, not the date of the repairs in the last column. Inspection records should remain on file for 3 years.

Colburn Street Bioretention

Inspector: _____ Date: _____

Component		What to Look for:	Deficiencies	Date of Repairs
☐	Upstream Drainage	General erosion, failed pipes, failed structures, sediment in CBs		
☐	Stone Swale	Erosion, sediment, debris		
☐	Sediment Forebay	Erosion, sediment, debris		
☐	Basin	Erosion, bare areas, embankment failure, sediment/debris, prolonged standing water (>72 hrs)		
☐	Mulch	Deterioration (mulch layer should be 3")		
☐	Plantings	Dead or unhealthy plants, weeds/invasives, overcrowding		
☐	Outlet Control Structure	Debris inside and out, structural failure, corrosion, leaks		
☐	Downstream Drainage	Failed pipes, failed structures, sediment in CBs, clogged tee at c/o		

TOWN OF DEDHAM

Commonwealth of Massachusetts

319 Non-Point Source Pollution Grants Program

Dedham Mother Brook Best Management Practice Implementation Project

Best Management Practice (BMP) Inspection Checklist

BMPs should be inspected twice per year and after any large storm events. One of the inspections should occur during early spring to ensure plantings and mulch are sufficient and any damage during snow removal operations is corrected. After each component is inspected, place a checkmark in the corresponding box. Not any problems in the "Deficiencies" column. After the problems are corrected, not the date of the repairs in the last column. Inspection records should remain on file for 3 years.

Sawmill Lane Bioretention

Inspector: _____ Date: _____

Component		What to Look for:	Deficiencies	Date of Repairs
☐	Stone Swale	Erosion, sediment, debris		
☐	Basin	Erosion, bare areas, embankment failure, sediment/debris, prolonged standing water (>72 hrs)		
☐	Mulch	Deterioration (mulch layer should be 3")		
☐	Plantings	Dead or unhealthy plants, weeds/invasives, overcrowding		
☐	Outlet Control Structure	Debris inside and out, structural failure, corrosion, leaks		
☐	Downstream Drainage / Outfall	Failed pipes, failed structures, sediment in CBs, erosion		

TOWN OF DEDHAM

Commonwealth of Massachusetts

319 Non-Point Source Pollution Grants Program

Dedham Mother Brook Best Management Practice Implementation Project

Best Management Practice (BMP) Inspection Checklist

BMPs should be inspected twice per year and after any large storm events. One of the inspections should occur during early spring to ensure plantings and mulch are sufficient and any damage during snow removal operations is corrected. After each component is inspected, place a checkmark in the corresponding box. Not any problems in the "Deficiencies" column. After the problems are corrected, not the date of the repairs in the last column. Inspection records should remain on file for 3 years.

Avery Street Water Quality Swale and Subsurface Infiltration

Inspector: _____ Date: _____

Component		What to Look for:	Deficiencies	Date of Repairs
☐	Upstream Drainage	General erosion, failed pipes, failed structures, sediment in CBs		
☐	Sediment Forebay	Erosion, sediment, debris		
☐	Stormceptor	Sheen/oil, sediment, corroded/ damaged components (see detail & manufacturer info)		
☐	Swale	Erosion, bare areas, overgrown, sediment/debris, prolonged standing water (>24 hrs)		
☐	Check Dams	Sediment, debris, overgrown, structural failure		
☐	Subsurface Infiltration	Sediment, pipe failure causing sinkholes, prolonged standing water (>72 hrs)		
☐	Outlet Control Structure	Debris inside and out, structural failure, corrosion, leaks		
☐	Downstream Drainage	Failed pipes, failed structures, sediment in CBs		

Attachment C

Stormceptor 450i Maintenance Guidance

11. Stormceptor Construction Sequence

The concrete Stormceptor is installed in sections in the following sequence:

1. Aggregate base
2. Base slab
3. Lower chamber sections
4. Upper chamber section with fiberglass insert
5. Connect inlet and outlet pipes
6. Assembly of fiberglass insert components (drop tee, riser pipe, oil cleanout port and orifice plate
7. Remainder of upper chamber
8. Frame and access cover

The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with joint seals, should be installed in accordance with the precast concrete manufacturer's recommendations.

Adjustment of the Stormceptor can be performed by lifting the upper sections free of the excavated area, re-leveling the base and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary. Once the Stormceptor has been constructed, any lift holes must be plugged with mortar.

12. Maintenance

12.1. Health and Safety

The Stormceptor System has been designed considering safety first. It is recommended that confined space entry protocols be followed if entry to the unit is required. In addition, the fiberglass insert has the following health and safety features:

- Designed to withstand the weight of personnel
- A safety grate is located over the 24 inch (600 mm) riser pipe opening
- Ladder rungs can be provided for entry into the unit, if required

12.2. Maintenance Procedures

Maintenance of the Stormceptor system is performed using vacuum trucks. No entry into the unit is required for maintenance (in most cases). The vacuum service industry is a well-established sector of the service industry that cleans underground tanks, sewers and catch basins. Costs to clean a Stormceptor will vary based on the size of unit and transportation distances.

The need for maintenance can be determined easily by inspecting the unit from the surface. The depth of oil in the unit can be determined by inserting a dipstick in the oil inspection/cleanout port.

Similarly, the depth of sediment can be measured from the surface without entry into the Stormceptor via a dipstick tube equipped with a ball valve. This tube would be inserted through the riser pipe. Maintenance should be performed once the sediment depth exceeds the guideline values provided in the Table 4.

Table 4. Sediment Depths indicating required servicing.

Sediment Depths Indicating Required Servicing *	
Model	Sediment Depth inches (mm)
450i	8 (200)
900	8 (200)
1200	10 (250)
1800	15 (381)
2400	12 (300)
3600	17 (430)
4800	15 (380)
6000	18 (460)
7200	15 (381)
11000	17 (380)
13000	20 (500)
16000	17 (380)
* based on 15% of the Stormceptor unit's total storage	

Although annual servicing is recommended, the frequency of maintenance may need to be increased or reduced based on local conditions (i.e. if the unit is filling up with sediment more quickly than projected, maintenance may be required semi-annually; conversely once the site has stabilized maintenance may only be required every two or three years).

Oil is removed through the oil inspection/cleanout port and sediment is removed through the riser pipe. Alternatively oil could be removed from the 24 inches (600 mm) opening if water is removed from the lower chamber to lower the oil level below the drop pipes.

The following procedures should be taken when cleaning out Stormceptor:

1. Check for oil through the oil cleanout port
2. Remove any oil separately using a small portable pump
3. Decant the water from the unit to the sanitary sewer, if permitted by the local regulating authority, or into a separate containment tank
4. Remove the sludge from the bottom of the unit using the vacuum truck
5. Re-fill Stormceptor with water where required by the local jurisdiction

12.3. Submerged Stormceptor

Careful attention should be paid to maintenance of the Submerged Stormceptor System. In cases where the storm drain system is submerged, there is a requirement to plug both the inlet and outlet pipes to economically clean out the unit.

12.4. Hydrocarbon Spills

The Stormceptor is often installed in areas where the potential for spills is great. The Stormceptor System should be cleaned immediately after a spill occurs by a licensed liquid waste hauler.

12.5. Disposal

Requirements for the disposal of material from the Stormceptor System are similar to that of any other stormwater Best Management Practice (BMP) where permitted. Disposal options for the sediment may range from disposal in a sanitary trunk sewer upstream of a sewage treatment plant, to disposal in a sanitary landfill site. Petroleum waste products collected in the Stormceptor (free oil/chemical/fuel spills) should be removed by a licensed waste management company.

12.6. Oil Sheens

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a rainbow or sheen can be seen at very small oil concentrations (<10 mg/L). Stormceptor will remove over 98% of all free oil spills from storm sewer systems for dry weather or frequently occurring runoff events.

The appearance of a sheen at the outlet with high influent oil concentrations does not mean the unit is not working to this level of removal. In addition, if the influent oil is emulsified the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified conditions.

TOWN OF DEDHAM

Commonwealth of Massachusetts

319 Non-Point Source Pollution Grants Program

Dedham Mother Brook Best Management Practice Implementation Project

Best Management Practice (BMP) Inspection Checklist

BMPs should be inspected twice per year and after any large storm events. One of the inspections should occur during early spring to ensure plantings and mulch are sufficient and any damage during snow removal operations is corrected. After each component is inspected, place a checkmark in the corresponding box. Not any problems in the "Deficiencies" column. After the problems are corrected, not the date of the repairs in the last column. Inspection records should remain on file for 3 years.

Colburn Street Bioretention

Inspector: NATHAN BUTTERMORE Date: 5/11/2017

Component		What to Look for:	Deficiencies	Date of Repairs
☑	Upstream Drainage	General erosion, failed pipes, failed structures, sediment in CBs	NO ISSUES	N/A
☑	Stone Swale	Erosion, sediment, debris	NEED TO EXTEND STONE AT END OF SWALE B/C IT'S STEEP	
☑	Sediment Forebay	Erosion, sediment, debris	CLEAN OUT AND RESHAPE WEIR	
☑	Basin	Erosion, bare areas, embankment failure, sediment/debris, prolonged standing water (>72 hrs)	RE-LOAM AND SEED 2 AREAS ON SLOPE NEXT TO PATH WHERE IT'S STEEP	
☑	Mulch	Deterioration (mulch layer should be 3")	NO ISSUES	N/A
☑	Plantings	Dead or unhealthy plants, weeds/invasives, overcrowding	NO ISSUES - ALL PLANTS ARE SURVIVING	N/A
☑	Outlet Control Structure	Debris inside and out, structural failure, corrosion, leaks	REMOVED MINOR LEAVES + MULCH AROUND GRATE	5/11/17
☑	Downstream Drainage	Failed pipes, failed structures, sediment in CBs, clogged tee at c/o	NO ISSUES	N/A

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Sawmill Lane Bioretention

Inspector: NATHAN BUTTERMORE Date: 5/16/2017

Component		What to Look for:	Deficiencies	Date of Repairs
☑	Stone Swale	Erosion, sediment, debris	LEAF & DEBRIS BUILDUP - WILL NEED TO BE REMOVED AFTER MWRA	
☑	Basin	Erosion, bare areas, embankment failure, sediment/debris, prolonged standing water (>72 hrs)	BASIN LOOKS GREAT, GRASS RECENTLY MOWED & IN GOOD SHAPE	N/A
☑	Mulch	Deterioration (mulch layer should be 3")	MULCH WAS RECENTLY ADDED	N/A
☑	Plantings	Dead or unhealthy plants, weeds/invasives, overcrowding	PLANTS ALL LOOK GREAT, MAYBE PLACE ONE MORE NEAR EMMETT SIDE OF OUTLET STRUCTURE	
☑	Outlet Control Structure	Debris inside and out, structural failure, corrosion, leaks	NO ISSUES	N/A
☑	Downstream Drainage / Outfall	Failed pipes, failed structures, sediment in CBs, erosion	NO ISSUES	N/A

NOTE - MWRA REDUNDANCY WATER MAIN WILL BE CONSTRUCTED THRU THIS AREA

TOWN OF DEDHAM

Commonwealth of Massachusetts

319 Non-Point Source Pollution Grants Program

Dedham Mother Brook Best Management Practice Implementation Project

Best Management Practice (BMP) Inspection Checklist

BMPs should be inspected twice per year and after any large storm events. One of the inspections should occur during early spring to ensure plantings and mulch are sufficient and any damage during snow removal operations is corrected. After each component is inspected, place a checkmark in the corresponding box. Not any problems in the "Deficiencies" column. After the problems are corrected, not the date of the repairs in the last column. Inspection records should remain on file for 3 years.

Avery Street Water Quality Swale and Subsurface Infiltration

Inspector: NATHAN BUTTERMORE Date: 5/11/2017

Component		What to Look for:	Deficiencies	Date of Repairs
☑	Upstream Drainage	General erosion, failed pipes, failed structures, sediment in CBs	NO ISSUES	N/A
☑	Sediment Forebay	Erosion, sediment, debris	REMOVE MINOR TRASH ACCUMULATION DURING NEXT MOWING	
☑	Stormceptor	Sheen/oil, sediment, corroded/ damaged components (see detail & manufacturer info)	REMOVED MINOR LEAF ACCUMULATION AROUND OUTLET. NO OIL; 2" OF LIGHT SLUDGE	
☑	Basin	Erosion, bare areas, embankment failure, sediment/debris, prolonged standing water (>72 hrs)	GRASS COMING IN NICELY	N/A
☑	Check Dams	Sediment, debris, overgrown, structural failure	CHECK DAMS NEED RESHAPED + BEEFED UP	
☑	Subsurface Infiltration	Sediment, pipe failure causing sinkholes, prolonged standing water (>72 hrs)	NO ISSUES	N/A
☑	Outlet Control Structure	Debris inside and out, structural failure, corrosion, leaks	NO ISSUES	N/A
☑	Downstream Drainage	Failed pipes, failed structures, sediment in CBs, clogged tee at c/o	NO ISSUES	N/A

TOWN OF DEDHAM

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Dedham Mother Brook Best Management Practice Implementation Project

Best Management Practice (BMP) Inspection Log

BMPs should be inspected twice per year and after any large storm events. One of the inspections should occur during early spring to ensure plantings and mulch are sufficient and any damage during snow removal operations is corrected. This log and inspection records should remain on file for 3 years.

Colburn Street Bioretention Inspection Dates:		Sawmill Lane Bioretention Inspection Dates:		Avery Street WQ Swale Inspection Dates:	
Inspector Initials	Date	Inspector Initials	Date	Inspector Initials	Date
NSB	10/19/16	NSB	10/19/16	NOT ONLINE	
NSB	5/11/17	NSB	5/11/17	NSB	5/11/17

TOWN OF DEDHAM

Commonwealth of Massachusetts

319 Non-Point Source Pollution Grants Program

Dedham Mother Brook Best Management Practice Implementation Project

Best Management Practice (BMP) Inspection Checklist

BMPs should be inspected twice per year and after any large storm events. One of the inspections should occur during early spring to ensure plantings and mulch are sufficient and any damage during snow removal operations is corrected. After each component is inspected, place a checkmark in the corresponding box. Not any problems in the "Deficiencies" column. After the problems are corrected, not the date of the repairs in the last column. Inspection records should remain on file for 3 years.

Colburn Street Bioretention

Inspector: NATHAN BUTTERWORTH Date: 10/19/2016

Component		What to Look for:	Deficiencies	Date of Repairs
☑	Upstream Drainage	General erosion, failed pipes, failed structures, sediment in CBs	NO ISSUES - CBs DO NOT REQUIRE CLEANING	N/A
☑	Stone Swale	Erosion, sediment, debris	NO ISSUES	N/A
☑	Sediment Forebay	Erosion, sediment, debris	NO ISSUES	N/A
☑	Basin	Erosion, bare areas, embankment failure, sediment/debris, prolonged standing water (>72 hrs)	HAVE BEEN MOWING SEVERAL TIMES PER MONTH	ONGOING/ AS NEEDED
☑	Mulch	Deterioration (mulch layer should be 3")	REMULCHED	May 2016
☑	Plantings	Dead or unhealthy plants, weeds/invasives, overcrowding	WEEDED - NO PLANT REPLACEMENT NEEDED	May 2016
☑	Outlet Control Structure	Debris inside and out, structural failure, corrosion, leaks	NO ISSUES	N/A
☑	Downstream Drainage	Failed pipes, failed structures, sediment in CBs, clogged tee at c/o	NO ISSUES	N/A

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Sawmill Lane Bioretention

Inspector: NATHAN BUTTERMORE Date: 10/19/2016

Component		What to Look for:	Deficiencies	Date of Repairs
☑	Stone Swale	Erosion, sediment, debris	NO ISSUES	N/A
☑	Basin	Erosion, bare areas, embankment failure, sediment/debris, prolonged standing water (>72 hrs)	MOWING SEVERAL TIMES PER MONTH	MAY 2016 AND ON
☑	Mulch	Deterioration (mulch layer should be 3")	REMULCHED	MAY 2016
☑	Plantings	Dead or unhealthy plants, weeds/invasives, overcrowding	WEEDED- NO PLANT REPLACEMENT NEEDED	MAY 2016
☑	Outlet Control Structure	Debris inside and out, structural failure, corrosion, leaks	NO ISSUES	N/A
☑	Downstream Drainage / Outfall	Failed pipes, failed structures, sediment in CBs, erosion	NO ISSUES	N/A

F2. Attachments

Deliverables Task 4: Outreach and Education

Dedham Mother Brook BMP Implementation Project
15-02/319

OUTREACH REPORT

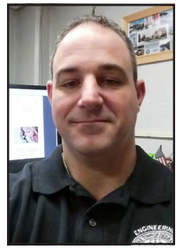
For the outreach component of this project, NepRWA conducted a town-wide mailing which provided information about the Dedham BMP projects and stormwater pollution as well as information about simple low impact design and best management practices that could be utilized on a residential or business scale to reduce the impact of runoff from individual properties (See Attached). This LID guide was also made available for download on the Town of Dedham website (See Attached). In addition to the mailing, NepRWA staff developed and the Town installed interpretive signage to be displayed at each of the BMP sites, explaining what the BMP is, how it reduces stormwater pollution, and suggestions of actions that individuals can take to reduce stormwater pollution (See Attached). Finally, NepRWA provided regular updates about the project and its progress, to the general public, via blog posts on their website (See Attached).

The direct mailing seemed to be the only feasible method to reach everyone in the town in an efficient and cost effective manner. NepRWA blog posts typically generate anywhere from 50 to 500 hits per post drawing attention from communities all across the Neponset River Waterhsed, making this a valuable complement to the mailing in order to reach the public and municipal officials beyond Dedham about the project, stormwater pollution, and best management practices in general. The interpretive signage was posted in prominent places where there is heavy foot traffic. The signage should be successful in further educating the public about stormwater pollution and what can be done, on an ongoing basis over the next 5-10 years.

Upon completion of the project, NepRWA circulated a press release announcing its successful completion and the project outcomes. This will be a follow-up opportunity to reinforce some of the messaging from previous communications. A copy of the resulting coverage is attached.

Overall, NepRWA was pleased with the results of the outreach strategy that was employed and would recommend using a similar strategy for future projects.

Dear Dedham Residents,



*With more than 90% of our drinking water coming from local sources along the **Neponset and Charles Rivers,** Dedham depends on clean waterways.*

Healthy waterways are also important for canoeing, kayaking, watching wildlife, or fishing on the Neponset or Charles Rivers.

*Just like most towns in Massachusetts, Dedham faces a problem with **stormwater pollution.** Runoff from our parking lots, roads, sidewalks, and other hard surfaces carries pollution into our water bodies. This pollution can make water bodies unsightly, and unsafe for swimming, boating, fishing, and other recreational activities.*

*Dedham is working towards a cleaner future by partnering with neighboring towns and the **Neponset River Watershed Association** to tackle stormwater pollution. Dedham, like many other communities, is also facing strict new stormwater regulations from the Environmental Protection Agency, and we are committed to meeting them.*

*Through our partnership with the Neponset River Watershed Association we have been able to secure grants to cover the cost of completing projects to keep our streams cleaner, like the **Mother Brook** project described on the back of this brochure.*

*In addition to the work Dedham is doing, we are encouraging residents and businesses to do their part to "**Soak up the Rain".** Simple steps like those described in this brochure can make a big difference when it comes to preventing water pollution. Learn more at: **www.neponset.org/soak-up-the-rain***

With your help, we can keep our local waterways clean!

Sincerely,

Jason Mammone, P.E., Director of Engineering
Dedham Department of Public Works

Mother Brook Stormwater Grant

Mother Brook is an important, historic waterway in Dedham that connects the Charles and Neponset Rivers. **It is the first man made canal in the United States.** Unfortunately, Mother Brook has been impacted by stormwater runoff and other pollution over the years.

Last year, the Town of Dedham partnered with the **Neponset River Watershed Association** and was awarded a grant from the **Mass Department of Environmental Protection** and the **U.S. Environmental Protection Agency** to clean up the polluted stormwater entering Mother Brook.

Sawmill Lane—pre-construction

Over the past several months, the **Dedham Department of Public Works** has been busy constructing several **stormwater treatment structures.** These structures allow road runoff to soak through the ground and be naturally filtered by soil and plants, instead of carrying pollution into Mother Brook.

Sawmill Lane—post-construction

There are two new *bioretention areas* on **Colburn Street and Sawmill Lane,** and one other structure to be built on **Avery Street.** Bioretention areas—also known as *rain gardens*—are low areas that use soil and plants to filter and treat runoff. They prevent pollution from entering our streams.

You can build your own rain garden on your property to capture driveway, roof or street runoff. This is a simple and beautiful way to help Dedham keep local waterways clean. To learn more about how to build a rain garden, and other simple techniques, visit **www.neponset.org/soak-up-the-rain**

This project is funded in part by a grant from the US Environmental Protection Agency and Mass Department of Environmental Protection. The contents do not necessarily reflect the views and policies of EPA or MassDEP.

Dedham Engineering & Public Works Department
in partnership with
Neponset River Watershed Association
2173 Washington Street
Canton, MA 02021

********ECRWSSEDDM****

POSTAL PATRON
DEDHAM, MA 02026

We're working every day to keep your waterways and drinking water clean and healthy.

Learn how you can help!

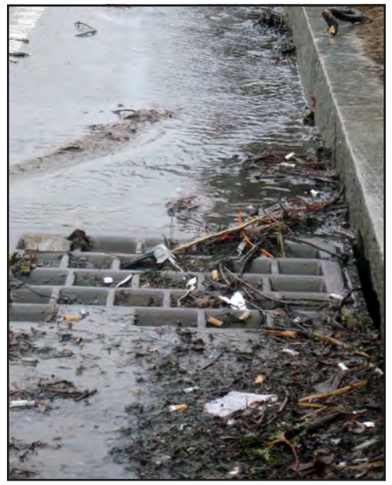
Join friends and neighbors, and help keep Dedham's waterways and drinking water clean and healthy for future generations.

Dedham has problems with polluted stormwater runoff.

Like most towns in Massachusetts, Dedham has many acres of pavement, concrete, and other **"impervious surfaces".** It's everywhere—our roadways, parking lots, playgrounds, and rooftops.

When rain hits these hard surfaces, it washes pollutants like **pet waste, bacteria, oil, litter, fertilizer, and grass clippings** into streams and town owned storm drains.

The storm drains discharge the **untreated polluted stormwater runoff** to local waterways—the Charles and Neponset Rivers—impacting the health of our drinking water, wildlife, and recreation.



Keep pavement clean and "soak up the rain" to stop stormwater pollution.

Dedham needs residents like you to help by keeping our pavement clean in the first place, and by encouraging stormwater runoff to **soak into the ground** naturally before it reaches town storm drains.

Rain gardens are a simple project you can build at home to help soak up the rain. **Redirecting pavement runoff** into a rain garden allows pollutants to be naturally filtered by plants and soil. It also reduces flooding and increases groundwater recharge.

Rain barrels are another simple project that can be used to store rain water for watering your lawn or garden.

Discounted rain barrels are available from the Dedham Westwood Water District: www.dwwd.org/rain-barrels

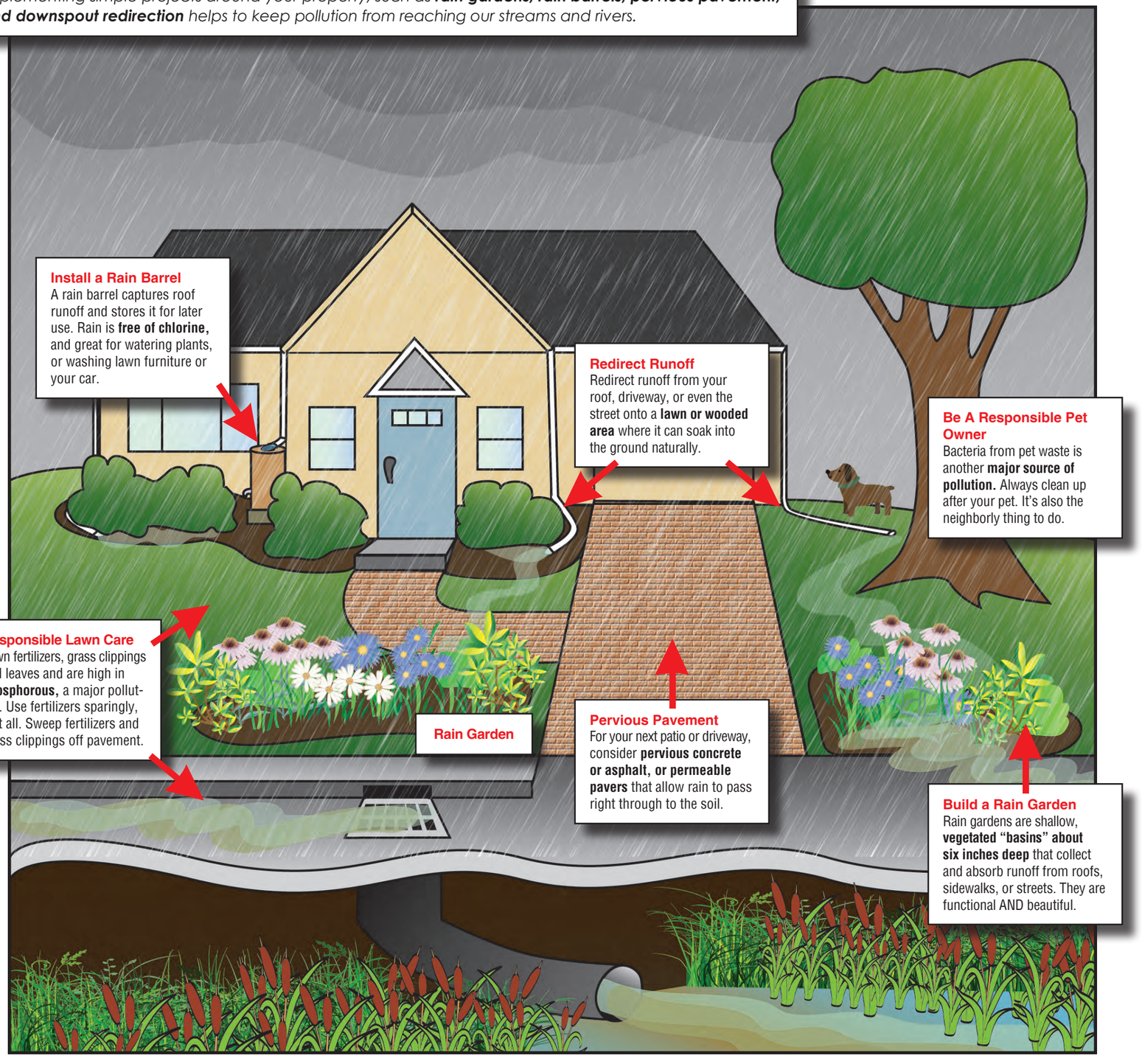
There's a lot that you can do to **"soak up the rain"** on your property to prevent local water pollution. It's easier and less expensive than you may think!

Visit us to learn more:
www.neponset.org/soak-up-the-rain

neponset river
WATERSHED ASSOCIATION

www.neponset.org | 781-575-0354

*Implementing simple projects around your property, such as **rain gardens, rain barrels, pervious pavement, and downspout redirection** helps to keep pollution from reaching our streams and rivers.*

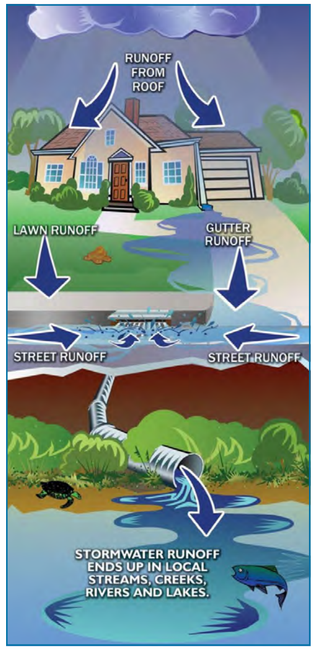


Polluted stormwater flows from stormdrains directly into local waterways, *untreated.*

Keeping Dedham's Water Clean

This site uses soil and plants to filter polluted runoff, restore drinking water supplies, and protect waterways.

More than 90% of Dedham's drinking water comes from **local groundwater resources** along the Neponset and Charles Rivers, so clean water is essential to all of us.



Unfortunately, like most towns in Massachusetts, Dedham faces a water pollution problem from stormwater runoff.

Runoff occurs during rainstorms, when bacteria, chemicals and sediment wash off roads, sidewalks, parking lots and other hard surfaces, and flow down stormdrains and directly into our waterways.

Stormwater pollution can make our water unsafe for recreational activities and for wildlife.

Dedham is working towards protecting local waterways by partnering with the **Neponset River Watershed Association** to prevent stormwater pollution.


Illustration by Doug Adamson.

You can help prevent stormwater runoff by properly disposing of pet waste, minimizing fertilizer use, redirecting downspouts, building rain gardens, and installing rain barrels or dry wells.

Learn more about preventing stormwater pollution:
www.neponset.org/soak-up-the-rain

PICK UP PET WASTE

LIMIT FERTILIZER USE

REDIRECT DOWNSPOUTS

BUILD RAIN GARDENS

USE RAIN BARRELS

INSTALL DRY WELLS

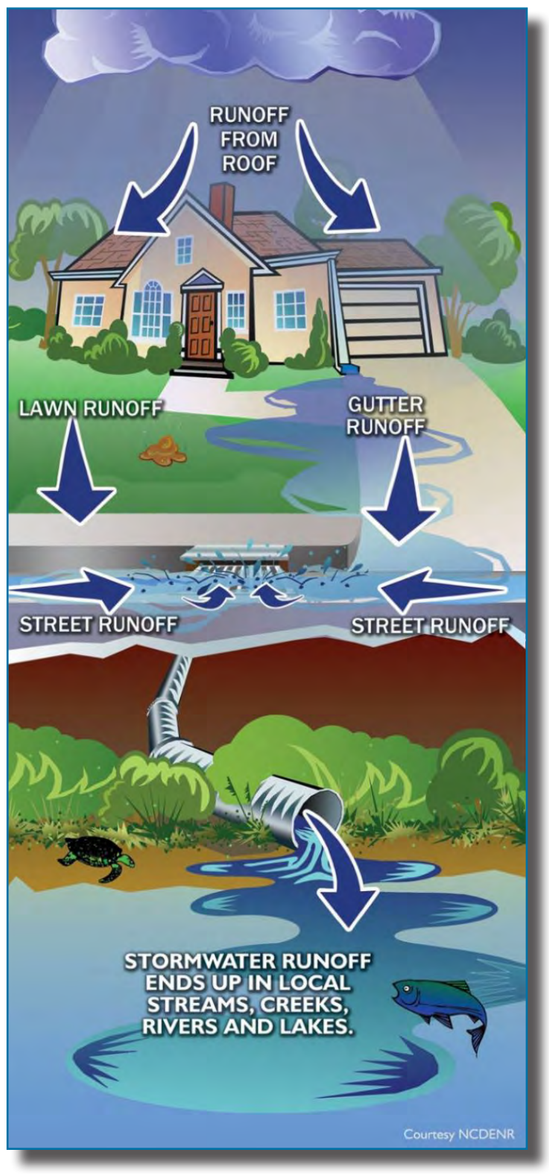
This project is funded in part by a grant from the U.S. Environmental Protection Agency and the Mass. Department of Environmental Protection. The contents do not necessarily reflect the views and policies of EPA or MassDEP. Learn more about the Neponset River Watershed Association at www.neponset.org

Keeping Dedham's Water Clean

This site uses soil and plants to filter polluted runoff, restore drinking water supplies, and protect waterways.

Illustration by Doug Adamson.

You can help prevent stormwater runoff by redirecting downspouts, building rain gardens, installing rain barrels or dry wells.



More than 90% of Dedham's drinking water comes from **local groundwater resources** along the Neponset and Charles Rivers, so clean water is essential.

Unfortunately, like most towns in Massachusetts, Dedham faces a water pollution problem from **stormwater runoff.**

Runoff occurs during rainstorms, when bacteria and chemicals wash off roads, sidewalks, parking lots and other hard surfaces, and flow down stormdrains and directly into our waterways.

Stormwater pollution can make our water unsafe for recreational activities and wildlife.

Dedham is working towards protecting local waterways by partnering with the **Neponset River Watershed Association** to prevent stormwater pollution.

To learn more, visit:
www.neponset.org/soak-up-the-rain

This project is funded in part by a grant from the US Environmental Protection Agency and Mass Department of Environmental Protection. Learn more about the Neponset River Watershed Association at www.neponset.org

Cleanup scheduled for impaired Mother Brook

Bioretention cells, similar to these installed in Milton years ago, will be placed along Mother Brook this fall to mitigate pollution caused by stormwater runoff. Courtesy photo

By Max Bowen
mboweb@wickedlocal.com

Posted Aug. 28, 2015 at 8:36 AM

DEDHAM

This fall, new bio filters will be installed along the Mother Brook to mitigate pollution so heavy that the water body has been deemed "impaired" by the Department of Environmental Protection [DEP].

When a body of water is deemed impaired, it pertains to the level of pollutants found through water samples, according to Sarah Bounty, environmental engineer for the Neponset River

Watershed Association. In the case of Mother Brook, samples are taken once a month from two locations.

Bacteria [E. coli]levels in Mother Brook taken from sampling points next to the Dedham Mall measured as high as 1,200 MPN per 100 milliliters [mL] in 2014. The state limit for Mother Brook is 235 MPN/100mL. This limit is set to protect human health for swimming in the river. She said bacteria levels increase as much as six times when it rains.

In an effort to correct this problem, the association will install a series of filters—paid for through a DEP grant—in front of catch basins on Colburn and Avery streets and Sawmill Lane. These structures, including bio-retention cells and a subsurface infiltration system, use soil and plants to filter and treat polluted runoff before it gets to the water. She said filters like these are common with new developments.

"The problem is you have older neighborhoods and you have to go back and put them in place," said Bounty.

Bounty said the proposed treatment structures would capture the runoff and remove up to 90 percent of pollution before the water makes its way to Mother Brook. Work is slated to begin this fall.

According to Bounty, MPN stands for "Most Probable Number." The test used for determining the number of bacteria in water samples is a statistical determination. It is based on growing a sample of bacteria on a number of Petri dishes and determining the most likely number of bacteria based on the number of dishes that are positive for growth.

Bounty added that this number has not been consisted 100 percent of the time, and it's usually found after stormwater has washed chemicals and trash into catch basins, which in turn carry the water into the brook.

"When it exceeds those standards you shouldn't go in and swim in it or interact with it, because that represents a health risk," said Bounty on Monday.

The Neponset and Charles rivers in Dedham are also listed as impaired water bodies for a variety of pollutants, including bacteria and nutrients such as nitrogen and phosphorus. Joseph Ferson, spokesperson for the DEP, said when a body of water is listed as impaired, the agency develops what is referred to as a pollution budget or Total Maximum Daily Load, a maximum of pollutants that the area can handle and still meet water quality standards for protecting public health and maintaining the uses of those waters.

"It's used as a regulatory tool that communities can use to adopt certain ways to alleviate the pollution," he said.

According to the DEP web site, most water bodies have good quality, but about 40 percent of the lakes, ponds, rivers, wetlands, and coastal waters in the nation are listed as impaired due to pollution.

High levels of phosphorus and other nutrients in the water can cause overgrowth of vegetation and depletion of oxygen from the water, and impact fish populations. Excessive nutrient pollution can also contribute to harmful algae blooms that produce toxins to people and pets. The association monitors the quality of water in the Neponset River and tributary streams, including Mother Brook, with a volunteer-based program now in its 20th year.

» Comment or view comments

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Vast Array of Trash Removed from Mother Brook During Cleanup

Dedham's Mother Brook Community Group and several volunteers spent a portion of the weekend cleaning trash out of the Mother Brook.

Dedham (http://patch.com/massachusetts/dedham), MA (http://patch.com/massachusetts)

By **FRANK O'LAUGHLIN** (Patch Staff) (http://patch.com/users/frank-olaughlin)
September 3, 2015

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Dedham's Mother Brook Community Group and several volunteers spent a portion of the weekend (http://patch.com/massachusetts/dedham/dedhams-residents-invited-help-clean-mother-brook-0) cleaning trash out of the water of the Mother Brook.

The Mother Brook's water levels were lowered over the weekend to allow town officials a chance to inspect and repair (http://patch.com/massachusetts/dedham/dedham-lower-water-level-mother-brook-0) the Colburn Street Dam.

As a result, the Mother Brook Community Group issued a call for assistance to clean up the community treasure, which flows through East Dedham's Condon Park.

More from Dedham Patch

- Could Your House Be the Next 'This Old House?' (http://patch.com/massachusetts your-house-be-next-old-house-0)
- Teen Murder Trial, FBI Raid, Missing Teens, and More: Nearby News (http://patch.com/massachusetts murder-trial-fbi-raid-missing-teens-more-nearby-news-0)
- City Sports to Close its Doors (http://patch.com/massachusetts sports-close-its-doors-0)

The array of items found in the Mother Brook during the cleanup is quite stunning.

Typewriters, shopping carts, washing machines and bicycles were among the garbage pulled from the water, Mother Brook Community Group member Dan Hart told the Dedham Transcript

(http://dedham.wickedlocal.com/article/20150902/NEWS/15090914un9).

The town of Dedham, though a Department of Environmental Protection grant, will install several filters this fall in an effort to prevent further pollution to the brook.

Across Massachusetts

- Somerville Cop Surprises Woman With Touching Gesture After Traffic Stop (Somerville, MA) (http://patch.com/massachusetts/dedham/s/feca0/somerville-cop-surprises-woman-with-touching-gesture-after-traffic-stop)

Trending Across Patch

- Cat Painting Sells For Close to $1M (South San Francisco, CA) (http://patch.com/massachusetts/dedham/s/fec9i/cat-painting-sells-for-close-to-1m)

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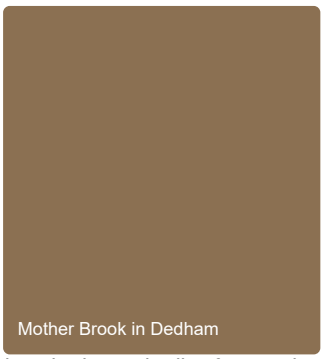
Dedham Cleaning up Stormwater for Mother Brook

Planned BMPs will help to reduce pollution, including bacteria, from reaching Mother Brook.

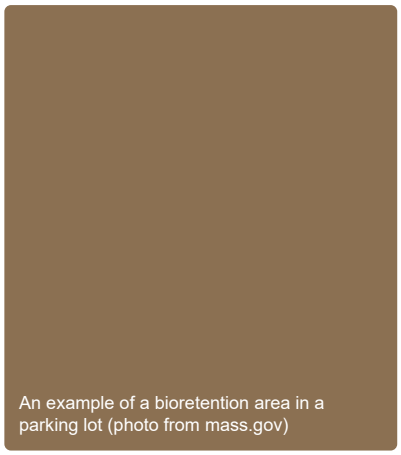


Mother Brook in Dedham

Thanks to a grant from MassDEP and EPA, Dedham is planning to construct three stormwater treatment structures (also known as Best Management Practices, or BMPs) on town property. NepRWA partnered with the town to apply for and secure this funding.

The BMPs include **bioretention cells** (similar to rain gardens), a **subsurface infiltration system**, and a **water quality swale**. Each of these structures will allow runoff water to filter through the ground and be naturally treated by plants and soil, rather than running straight into Mother Brook and carrying pollution with it.

Mother Brook, the Neponset River, and the Charles River in Dedham are all listed as impaired waterbodies for a variety of pollutants, including bacteria and nutrients, such as nitrogen and phosphorus, by MassDEP.



An example of a bioretention area in a parking lot (photo from mass.gov)

Data from our **Citizen's Water Monitoring Network (CWMN)** shows that Mother Brook has high levels of bacteria when it rains. This presents a risk of illness to anyone boating, fishing, or swimming in the water. Additionally, nutrients such as nitrogen and phosphorus have been high, which can lead to other issues such as harmful algal blooms and low dissolved oxygen. Algae blooms can produce toxins that can make people and pets sick, and when the algae dies and decays, it consumes the oxygen in the water that the fish need to breathe.

The proposed treatment structures will capture the runoff and **remove up to 90% of pollution** from the tributary area before the stormwater makes its way to Mother Brook!

Construction is expected to take place this fall on Colburn Street, Avery Street, and Sawmill Lane.

August 2015

Sarah Bounty, Environmental Engineer

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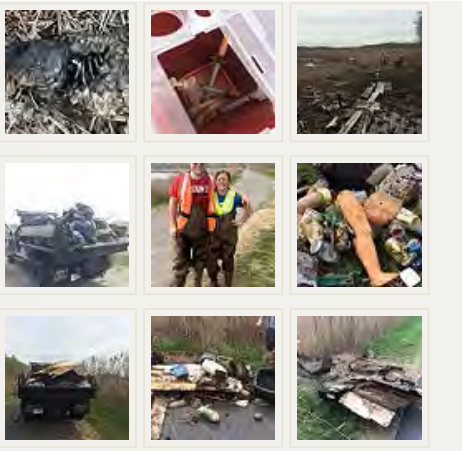

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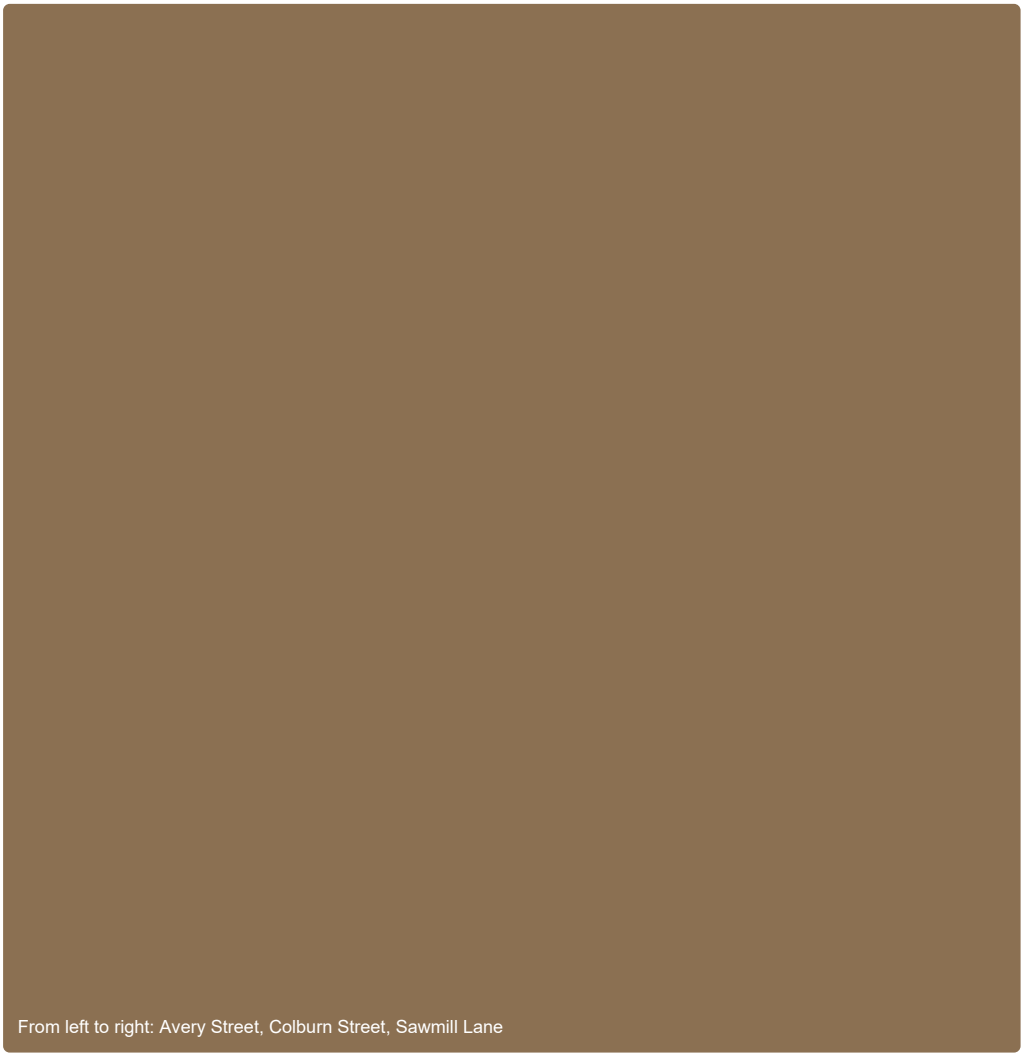
Dedham Stormwater Project Wrapping Up

The final stormwater structure is currently under construction on Avery Street.

The Avery Street swale is the last of three structures built to collect and filter stormwater runoff before it reaches **Mother Brook.** A stormwater swale is a linear trench that is intended to manage stormwater runoff. The other two structures are located on the corner of Sawmill Lane and Emmet Ave, and on the corner of Colburn St. and Hyde Park St.

The Dedham Stormwater Project is a collaboration between the town of Dedham and NepRWA, utilizing 319 grant funds from MassDEP. For any questions about the project, please contact NepRWA Environmental Scientist, Chris Hirsch at 781-575-0354 x 302 or email at hirsch@neponset.org.



From left to right: Avery Street, Colburn Street, Sawmill Lane

Stormwater runoff occurs when rain or snowmelt flow over impervious surfaces like driveways, sidewalks, and streets. Run off picks up trash, pet waste, fertilizers, dirt, and other pollutants and carries it into the storm drain system or directly to the nearest waterbody.

- ***Anything that enters a storm drain system is discharged, untreated, into the waterbodies we use for swimming and fishing.***
- All of the water that runs off without being absorbed into the ground is

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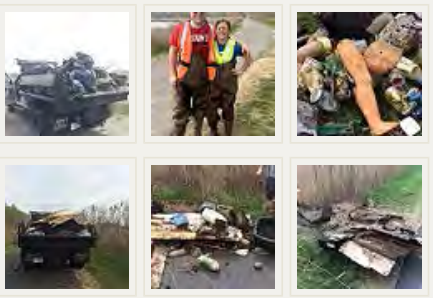

water that isn't recharging our drinking water supplies.

In the Neponset Watershed, **stormwater runoff is a major source of bacteria and nutrient pollution.** This poses a major health risk for anyone that recreates in the water immediately following a rain event, or for anyone that comes in contact with a *cyanobacteria bloom* driven by excess-nutrients.

The stormwater structures built in Dedham collect stormwater runoff before it enters the drain system and they **filter the runoff using special soils and plants** to remove many of the pollutants. If properly maintained these structures will help clean up Mother Brook every time it rains.

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WICKED LOCAL DEDHAM
NEWS FROM THE DEDHAM TRANSCRIPT

Rain gardens installed in Dedham

Posted Jun 2, 2017 at 2:27 PM

Two rain gardens, located on public property and especially designed to control and clean rainwater runoff from nearby streets, were installed last year in Dedham.

Installed at Dedham Parkway and Emmett Avenue, and at Colburn and Hyde Park Streets, the rain gardens are a joint project of the Dedham Public Works Department and the Neponset River Watershed Association. A third project at Avery East Streets serves the same purpose, but is a swale design rather than a rain garden.

With a rain garden, everything from location to design and plantings are selected based on scientific criteria for effective storm-water control and filtration, according to NepRWA environmental scientist Chris Hirsch.

“By allowing stormwater to soak into the ground, rain gardens reduce polluted runoff from roadways,” said Hirsch.

Flowering plants in the Dedham rain gardens include red chokeberry, blue cardinal flower and black-eyed susan.

Technically termed bioretention cells, rain gardens were introduced in the 1990s by housing developers as an alternative to the traditional retention pond.

Coburn Street, the larger of the two local rain gardens, is in a mini-park setting complete with a new walkway beside the rain garden. The DPW recently installed the final pieces of the project, two park benches and an information kiosk.

The cost of the Dedham projects was split between the town and a state grant administered through NepRWA, which also assisted with site selection and design engineering. Nearly all of the town’s contribution came in the form of

DPW labor to construct the three installations, keeping actual dollar costs minimal.

“Together, these three projects represent an important step forward in managing stormwater and reducing polluted runoff,” said DPW Director Joe Flanagan. “At Coburn Street, we were also able to add some neighborhood amenities thanks to our DPW crew.”

The Neponset River Watershed Association is a grassroots, member-supported conservation group working to clean up and protect the Neponset River, its tributaries and surrounding watershed lands. For more information, call 781-575-0354 or visit _____.